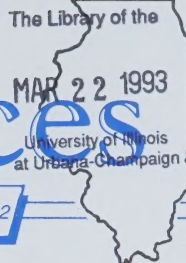


Illinois Resources



Illinois Department of Energy and Natural Resources July/August 1992



Great Lakes governors sign environmental agreement

Governor Jim Edgar and seven other Great Lakes governors have approved environmental initiatives to stimulate recycling markets and reduce the frequency and severity of oil spills.

The centerpiece of the recycling initiative is an agreement by the governors to mobilize their purchasing power—both jointly and individually—to create and expand markets for recyclable materials. The oil spill initiative will bring together state officials and representatives of the petroleum industry to help prevent oil spills and assure quick and effective responses if and when they occur in the Great Lakes region.

“Through cooperation between gov-

ernors and between the public and private sectors we can better prevent pollution and other problems, as well as respond to emergencies,” Edgar said.

“I am particularly pleased with the recycling agreement. Many of us who have pushed for recycling to reduce waste have been confronted with insufficient markets for recyclable materials. This initiative will help close the recycling loop by stimulating and bolstering such markets,” the governor said.

The recycling agreement provides for:

- ♦The largest-ever multistate purchase of recycled high-speed copy paper.
- ♦Exclusive use of re-refined lubricating oil in state government facilities and

vehicles.

♦Establishment of a “Standards Board” of state purchasing and recycling officials, recycling experts and industry representatives to recommend uniform specifications for recycled goods that could be purchased either jointly or individually by Great Lakes states.

Each state will retain the right to forego

continued on page 4

State motor pool now offers ethanol cars for state use

Governor Jim Edgar recently welcomed the arrival of 12 new variable-fueled Chevrolet Luminas to the state’s motor pool fleet. Edgar, a strong ethanol advocate, said the vehicles will be used in a three-year demonstration project designed to prove the value of ethanol as a clean-burning fuel that can help improve our air quality.

“Illinois is already a leading state in the nation in the use of 10 percent ethanol fuel,” Edgar said. “Testing vehicles that run primarily on ethanol is the next logical step. This is another example of Illinois’ commitment to the use of ethanol as a fuel for the future.”

The cars are identical to regular gasoline vehicles except for their variable fuel features. As variable-fueled vehicles, the Luminas will operate with unleaded fuel or any mixture of ethanol and gasoline. However, the cars are designed to optimally run on a blend of 85 percent denatured, 200-proof ethanol and 15 percent natural gasoline, hence the designation “E-85.”

General Motors built 50 ethanol vehicles for testing this year. Illinois and Wisconsin each have 12 cars and the federal government has the remainder. The cars will be tested for performance, reliability and cost of operation. The cars will also be extensively tested to determine how well ethanol will meet new U. S.

continued on page 4



Governor Jim Edgar (right) accepts the keys to a new ethanol-powered Chevrolet Lumina from Gerald Barnes, manager of alternative fuels activities, General Motors Corporation. The '92 Lumina is part of the state's new ethanol demonstration fleet.

Photo by Tom Hecht, ENR

Newspaper publishers commit to recycled newsprint

Publishers of Illinois newspapers are exceeding state mandates for purchasing and using recycled newsprint according to a recently released ENR report.

The *Recycled Newsprint Use Act Report* is the first attempt by the state to collect and publish statistics regarding recycled newsprint. According to the report, recycled fibers made up 23 percent of the 445,000 tons of newsprint produced by Illinois newspapers during 1991. Newspaper publishers reported using recycled-content newspaper from 11 North American mills.

The Act requires newspaper publishers to certify annually to ENR the amount of newsprint they consume and the percentage of recycled fibers present in each type of newsprint they use. Beginning January 1, 1991, Illinois newspaper publishers were required to meet average annual statewide recycled-fiber usage goals of 22 percent. The goals will increase to 25 percent beginning January 1, 1992, and 28 percent beginning January 1, 1993.

"Despite tough economic times, newspaper publishers have made a strong commitment to use more recycled newsprint,"

said John Hendren, a research economist with the ENR Office of Recycling and Waste Reduction. "We expect Illinois newspaper publishers to continue to increase their consumption of recycled newsprint, which will result in improved recycling markets for old newspaper."

kets for old newspaper."

Thirty daily Illinois newspapers consume more than 95 percent of all newsprint used in the state and account for 95 percent of the recycled fibers used. The *Chicago Tribune* and the *Chicago Sun-Times* are the largest users of recycled newsprint. In 1991, the *Tribune* consumed more than 77,000 tons of 61 percent recycled-content newsprint and the *Sun-Times* consumed more than 26,000 tons of 100 percent recycled-content newsprint.

Illinois is also home to an excellent supplier of recycled newsprint. The FSC newsprint mill in Alsip is one of the few paper mills in North America that produces 100 percent recycled newsprint.

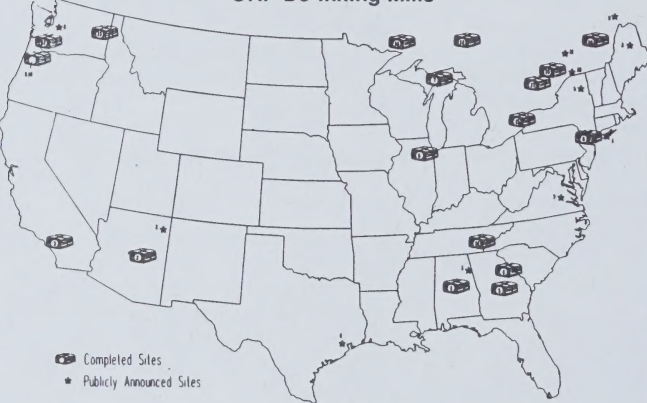
"The Illinois Press Association is working with ENR to aggressively promote use of recycled newsprint in the state," IPA Executive Director David L. Bennett said. "We believe as many newspapers as possible should participate, but the current market is very tough."

"Reducing the amount of old newsprint in the waste stream on a long-term basis will require more creative scenarios for new products and many more business participants than just newspapers," Bennett added.

ENR, in cooperation with the Illinois Press Association, identified and contacted

continued on page 12

ONP De-Inking Mills



Source: American Newspaper Publishers Association

Map Prepared by the Illinois Department of Energy and Natural Resources, April, 1992

New tire fee will help to alleviate used tire accumulation

Illinois now has the resources to expand recycling markets for used tires and reduce the millions of tires stockpiled in the state.

Tire retailers began collecting a new \$1 per tire fee on July 1 as a result of legislation passed by the Illinois General Assembly last fall. The fee is also expected to help pay for the cleanup of large tire accumulations.

"Used tires are a widely discarded resource. Illinoisans generate an estimated 12 million used tires for disposal every year. Over time, tires have accumulated in tire dumps located in industrial and rural areas," ENR Director John S. Moore said. An estimated 40 million tires have been indiscriminately discarded in Illinois.

Legislation enacted last fall (P.A. 87-0727) requires tire retailers to charge a \$1

fee on each tire sold and to accept for recycling an equal number of used tires from the customer.

Tire dumps and illegal stockpiles of tires pose serious public health and environmental threats. Tires that are burned in the open air present a host of pollution problems. The transportation and accumulation of used tires have been linked to the spread of the Asian tiger mosquito, a potential carrier of St. Louis and LaCrosse encephalitis and other debilitating viruses.

In 1989, the Illinois General Assembly created the Used Tire Management Program. The program is administered by ENR and the Illinois Environmental Protection Agency (IEPA). ENR administers a financial assistance program to encourage used tire collection, processing and

recycling, while IEPA regulates used tire storage sites. The Environmental Protection Act prohibits landfill disposal of whole tires after July 1994 and authorizes IEPA to take preventive, corrective and removal actions at tire sites that endanger public health and the environment.

In 1991, the governor expanded the state's recycled-product procurement program to include testing and use of remanufactured tires, asphalt rubber and other recycled-content products. Through an interagency agreement, ENR and the Illinois Department of Transportation are testing the use of rubber-modified asphalt in road construction. The Department of Central Management Services is purchasing remanufactured tires for use on state motor pool vehicles. □

ILEED program honors 20 schools as award winners

Twenty Illinois schools were selected by ENR as award winners in the Illinois Energy Education Development (ILEED) program. The ILEED committee presented the awards to the school during a Springfield luncheon that featured an address by Art Peekel, Illinois' Teacher of the Year.

In addition to winning state honors, three school programs—Hunting Ridge Elementary School in Palatine, Rushville High School in Rushville, and School District #54 in Schaumburg—will represent Illinois in the National Energy Education Development (NEED) awards program this summer in Washington, D.C.

"The continuing efforts of the ILEED program provide thousands of students with valuable experience dealing with energy and environmental issues," ENR Di-

rector John S. Moore said. "Students are able to develop informed opinions and then apply them as responsible members of their schools and communities."

Approximately 600 schools and educational organizations participated in ILEED during the 1991-92 school year. Students developed and conducted projects designed to teach themselves and others the importance of energy and the environment. ILEED services include workshops, printed and audiovisual materials, newsletters, energy-auditing training, and internships for high school students. [See story on ILEED Energy Intern program, page 6.] □

Teacher of the Year Art Peekel addresses the 1992 ILEED award winners during the ceremony honoring Illinois' energy education development programs.

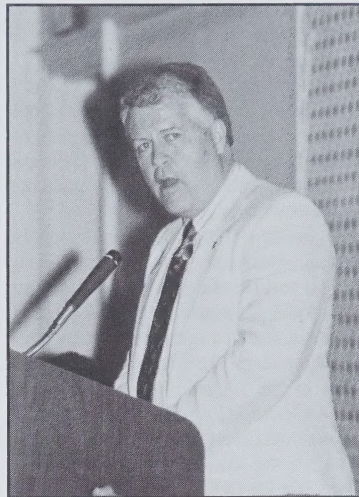


Photo by Paul Thomson, ENR

1992 ILEED Award Winners

Junior Level Winner

Hunting Ridge
Elementary School,
Palatine

Senior Level Winner

Rushville High School,
Rushville

District Level Winner

School District #54,
Project C.A.R.E.,
Schaumburg

Statewide Winners

Washington Elementary School,
Jacksonville

District #47, Crystal Lake

Kimball Hill School, Rolling Meadows

Mt. Zion Junior High School, Mt. Zion

Dundee Highlands, West Dundee

Plum Grove Junior High School,
Rolling Meadows

Edwardsville High School, Edwardsville

Kilmer Elementary School, Chicago

District #15, Palatine

East Peoria Community High School,
East Peoria

Illinois Rivers Project, Edwardsville

Willow Bend School, Rolling Meadows

Moonlight and Cloverton 4-H, Valmeyer

Westmer Elementary School-5A,
New Boston

Rhodes School, River Grove

Our Lady of Ransom, Niles

Glenwood Junior High School, Chatham

1993 declared Year of American Craft

The state of Illinois has announced its participation in *Celebrate Craft in the Americas, the Year of American Craft 1993*. Encompassing Canada, the United States and Latin America, the year will draw international attention to craft and the craft person, focusing on each area's historical roots, diverse cultural heritage and contemporary crafts.

Governor Jim Edgar, believing the *Year of American Craft 1993* can bring Illinois national recognition as a state that values and promotes its talented artisans, has requested that agencies work together on the project. The Illinois Artisans Program of the Illinois State Museum, the Illinois Historic Preservation Agency, the Illinois Arts Council, the Illinois Bureau of Tourism, the Office of the Secretary of State, and the Office of the Governor will join with the Illinois Humanities Council and key leaders in the public and private

arts and craft sectors, as well as the business community, to make the year a resounding success for crafts in Illinois.

The year-long celebration will:

- ◆ Increase public exposure to arts and crafts through exhibits at museums, galleries, schools, institutions and other public places throughout the state.

- ◆ Increase public awareness of craft as an important art form and recognition of it as a vibrant and growing industry in Illinois.

- ◆ Develop a statewide database of Illinois craft artists and organizations.

- ◆ Establish partnerships with media, business and tourism agencies to expand opportunities for crafters and craft endeavors.



Over the next six months and throughout 1993, the Illinois committee will be contacting all segments of the greater arts and crafts community seeking cooperation in meeting these goals. By working together, the *Year of the American Craft 1993* promises to be a celebration from which the effects will continue to reverberate in years to come.

For more information, contact Ellen Gantner at (312) 814-4945 or Carole Stodder at (312) 814-1952. □

New groundwater video developed to aid protection efforts

ENR has produced a 14-minute video on *Groundwater Protection: Designing a Field Demonstration*. The video reviews steps to arrange groundwater protection demonstrations, either as a special program or as part of other field days, fairs, conservation tours or agronomy events.

The video emphasizes a team approach to developing the demonstrations, and presents visual examples of more than a dozen demonstrations that are adaptable to most locations. The Illinois demonstrations highlighted in the video include showing groundwater models, sampling water, sealing abandoned wells, maintaining fuel tanks, marking setback zones, maintaining septic systems, performing pump inspections, properly handling agricultural chemicals, and recycling oil.

Copies of the video have been distributed to local and regional extension, soil conservation, and public health offices. Additional copies are available for loan from the ENR information clearinghouse by calling 1-800-252-8955 (in Illinois) or 217-785-0310 (out of state). For more information on video content, contact Harry Hendrickson at 217-785-8577. □

Governors' agreement *continued from page 1*

the joint purchase process if it can obtain the high-speed copy paper more cheaply on its own. However, the joint solicitation is expected to result in the purchase of more than 30 million pounds of recycled paper. In addition, the Great Lakes governors are anticipating expansion of the joint purchase process in the years ahead to include the full range of paper products.

The governors also agreed they would act to ensure that all waste oil generated at state facilities is properly recycled. "Improper disposal releases more oil into the

U.S. environment each year than did the Exxon Valdez disaster," Edgar said.

The oil spill initiative will feature public-private sector cooperation to assure there is adequate response capability and to develop cooperative approaches to spill prevention.

Task forces will inventory current resources for responses to oil spills and gather data on oil movements and storage facilities to determine if and where additional response capability is needed. □

Ethanol cars delivered *continued from page 1*

Environmental Protection Agency vehicle emission standards.

Ethanol is an oxygenate—an octane enhancer that contains oxygen. The extra oxygen allows ethanol/gasoline blends to burn cleaner than unblended gasolines. Even the commonly used 10 percent blend of ethanol with gasoline has been shown to significantly reduce dangerous carbon monoxide emissions. In the Chicago area, where the 10 percent ethanol blend is frequently used, carbon monoxide levels remain well below U.S. EPA standards.

Preliminary research has also shown that gasoline blended with 10 percent ethanol does not increase ozone because of the combination of reduced carbon monoxide and lower reactivity. Ethanol by itself has a lower vapor pressure than gasoline,

thereby reducing evaporative emissions. Both the total evaporative and tailpipe emissions from the "E-85" vehicles are expected to be significantly lower than emissions from standard gasoline vehicles.

The ethanol fleet demonstration project is a cooperative effort between ENR and the Illinois Department of Central Management Services (CMS). CMS has purchased the vehicles to replace older vehicles in the state's motor pool. ENR is using federal funds to help offset the higher production costs for the cars. ENR is sanctioning the testing and demonstration of the ethanol vehicles. The ethanol producers are furnishing the corn-based alcohol fuel to be used in the cars at no cost to Illinois taxpayers. □

ENR recycling grant program presents 1992 awards

More than \$1.5 million in state grants were awarded to 33 communities, businesses, schools and not-for-profit organizations to increase the quantity and quality of materials recycled in Illinois.

The recycling grant money comes from a state surcharge on the disposal of solid waste in Illinois landfills.

"Illinois ranks among the top five states in the country in the number of curbside recycling programs," Governor Jim Edgar said. "In addition to supporting local collection programs, it is important for Illinois consumers to purchase recycled and recyclable packaging and products to help close the recycling loop."

The grants are administered by ENR and awarded on a competitive basis. The 1992 recipients include processors of recycled materials and those who promote residential, commercial and institutional recycling programs.

"We have done a good job collecting recyclables from single-family households," ENR Director John S. Moore said. "We must move into the next recycling phase by targeting commercial and institutional sectors of Illinois that generate the majority of trash discarded in landfills."

Projects funded by this year's program include:

- ♦residential recycling, such as curbside, drop-off centers and buy-back facilities;

- ♦commercial/institutional recycling, such as recycling programs for businesses and educational, recreational and health care facilities; and

- ♦primary processing facilities, especially regional facilities that prepare materials that are recyclable for shipment to secondary processors and/or markets.

This is the 10th grant round of the ENR recycling grant program under the provisions of the Solid Waste Management Act. Residential and commercial grantees are eligible for up to \$50,000, and primary processing facility grantees may receive up to \$100,000. Grant awards may constitute up to 50 percent of the total project cost.

The grants will attract \$8.3 million in matching funds from grant recipients. At least \$150,000 of the money awarded will

1992 Recycling Grant Awards

| Residential | | | |
|---|---------------|--|----------|
| Grimm Bros. Trucking, Morton | Curbside | | \$50,000 |
| Village of Frankfurt | Curbside | | 13,750 |
| Village of Addison | Drop-off | | 43,716 |
| Village of Channahon | Curbside | | 8,300 |
| Village of Bellwood | Curbside | | 32,682 |
| Staunton Area Recyclers, Inc., Staunton | Drop-off | | 14,070 |
| Intergovernmental Solid Waste Disposal Association, Champaign | Multifamily | | 25,292 |
| Reliable Sanitation Service, Waterloo | Drop-off | | 42,224 |
| Americana Towers Condo Association, Chicago | Multifamily | | 50,000 |
| City of Belvidere/Boone County | Drop-off | | 7,000 |
| Commercial | | | |
| Bethel New Life, Chicago | Commercial | | 36,842 |
| McLean County | Office | | 3,627 |
| GC Thorsen, Inc., Rockford | Office | | 15,726 |
| North Shore Waste Control, Lake Bluff | Commercial | | 50,000 |
| PaperSavers, Inc., Elgin | Office/School | | 49,772 |
| University of Chicago | University | | 30,000 |
| Resource Transport Ltd., Lisle | Commercial | | 50,000 |
| College of DuPage, Glen Ellyn | University | | 38,000 |
| Landfill Alternatives, Inc., Elburn | School | | 24,819 |
| Kishwaukee College, Malta | University | | 11,000 |
| Rend Lake College, Ina | University | | 20,749 |
| Rubbish Removal Services, Makanda | Schools | | 47,358 |
| C & M Recycling, Inc., North Chicago | Commercial | | 50,000 |

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ILEED interns discuss their generation's energy/environment

The ENR Illinois Energy Education Development (ILEED) Program works with concerned teaching professor educational, energy and environmental excellence to students. ILEED emphasizes communication skills, problem

The ILEED Energy Intern Program was developed to: interest high school students in energy/environmental school-based education and the work force, involve the community in the educational process, and increase students' careers. Now in its third year of operation, the program provides high school students with two months of paid, practical interns in an energy/environmental field.

Many students who participated in the first two energy intern programs are now pursuing engineering and have a renewed interest in energy and the environment after their summer work experiences, along with a sense of accomplishment to learn. Sponsors also report positive experiences with the intern program: "Having a summer intern was very of teaching him what we do and seeing him take on those responsibilities and do well at them, we all have a clear view of what we are doing."

As part of the application process, the students were asked to write an essay answering these questions: What energy or environmental problem(s) facing your generation? What solutions might be possible? Some of the essays are here.

*Mary Swanson
Lincoln Community High School
Lincoln, IL*

The most pressing energy and/or environmental problems facing my generation are multifaceted. They involve the delicate balance of human vs. environmental needs. No single problem can be viewed singularly. They are all interrelated and true solutions are interdependent. It is similar to a chemical equation in equilibrium: human needs on the right in equilibrium with the environment on the left and population as the catalyst. The human needs involve energy and food production, living space and usable resources. The environmental side of the equation includes all of the natural resources of the earth, its animal and plant life, and the atmosphere around the planet. As the human population increases, it tends to drive the equation to the right in order to supply the demands of humans for food, energy and living space. These needs deplete the environmental side of the equation. It is no longer in equilibrium.

Our problem in the next century is to learn to control and balance the equation so that the human population can exist in equilibrium with the environment. We

must continue to produce adequate food to support the population. To minimize the detrimental effect of massive food production, we must develop nonpolluting methods and a better distribution system, so that nonproductive land, such as the tropical rain forests, are not improperly used and destroyed. Bioengineering could develop

more natural pest and weed controls and more disease-resistant varieties of food plants.

Our energy needs must be fulfilled with nonpolluting, renewable resources. More research needs to be supported on solar, fusion, geothermal and plant-based energy production. Extensive recycling programs are needed to preserve natural resources and decrease the need for solid waste

disposal. Chemical engineers need to focus on systems of chemical conversion to detoxify industrial and farming waste. Toxic materials should not be put into production until adequate disposal techniques are in place.

Geologists and environmental engineers are developing new and innovative techniques for identifying, tracking and retrieving groundwater pollutants. It is up to the industrialized world to solve most of these problems of pollution, but the cata-

lyst of population control must be addressed by the Third World countries where the population is growing out of proportion to their ability to support it.

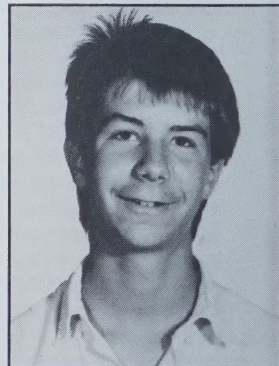
It will take unprecedented cooperation of the peoples of the earth in the 21st century to achieve the balanced equation of human vs. environmental needs. We must all learn to think globally and long term about the impact of our decisions on our home: EARTH. ○



Swanson

*Daniel Trapp
Belleville Township High School West
Belleville, IL*

As of March 23, 1992, I am unaware of any method that can be used to successfully predict the future. Therefore, I do not know for certain the problems that the future will face. I do know, however, that many of the future problems will stem from the environmental and energy problems of today.



Trapp

al problems and offer solutions

and community leaders to promote living and goal setting.

issues, demonstrate the link between ent interest in energy/environmental sional-level employment as summer

nical majors. The students displayed plishment and self confidence and a good for our program. In the process perspective of why we are doing what

at do you perceive to be the greatest judged to be excellent are included

The issues of today that are most likely to cause the problems of tomorrow include inefficient electricity production and insufficient waste disposal methods.

First of all, inefficient electricity production is plaguing the world today. Although some methods of production are efficient, such as hydroelectric power, many others lack efficiency. Many of the methods used to produce electricity also produce a great deal of pollution. This pollution consists mainly of air pollution, but water is also polluted. These effects may be of little concern to the world today since they aren't yet too noticeable. As the demand for electricity continually increases, however, so shall the problems with it.

Secondly, insufficient waste disposal methods will besiege tomorrow's world. My knowledge of waste disposal might not be of a large amount, but I do know that the current methods are not keeping up with the demand. I know this for certain by the large amounts of media coverage that are being drawn to this problem. Landfills are quickly filling up and new methods of ridding our world of waste aren't being created.

Both previously mentioned problems will continue to grow unless something is done. I believe that the solution to the two problems might be one and the same. A possible solution might be to somehow harness energy from the waste. This might sound like I have watched "Back to the Future" one too many times, but I believe

Amy Pletsch
Glenwood High School
Chatham, IL

The greatest environmental problem facing this generation is lack of awareness. Awareness is the primary stepping stone in solving any of the environmental and energy problems of today.

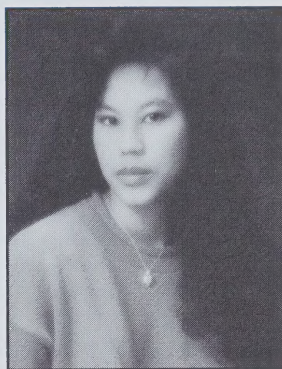
With gasoline shortages and higher prices, the public was made aware of the energy crisis. People made efforts to conserve fuel by carpooling and cutting down on needless gas expenditures. Until higher prices forced people to become aware, no efforts were made to become more energy efficient.

Much more literature on energy and environmental issues is available to the public now than ever before. This increased availability of information and increased awareness has brought about changes in everyday lives. Many individuals now save and recycle items such as soda cans, glass bottles and newspapers. As consumers, individuals are more likely to buy ozone-safe and recycled products.

Besides a direct positive impact on the environment and its resources, this increased awareness dominoes up into higher organization, creating more profound effects. Demand from the public has forced such diverse major corporations and production companies such as Lifesavers,

it is possible. In fact, I have heard of certain cases in which gas has been harnessed from sewage. In addition, I believe that an emphasis should be put on solar energy, hydroelectric energy and energy drawn from the wind.

In conclusion, the Earth has been presented with many problems. Two of the greatest problems are inefficient electricity production and insufficient waste disposal methods. One possible solution to these problems is using the waste to produce electricity. Finally, a solution must be created if my generation is to flourish. ☐



Pletsch

Revlon and McDonalds to use environmentally safe and recycled goods. Companies employ research teams to enable environmentally safe and efficient production.

This push from the public also affects governmental positions. Organizations such as Greenpeace, as well as influential individuals such as Ralph Nader, have lobbying power to promote stricter production standards on manufacturers and major businesses.

As the governmental standards are pushed toward energy and environmental conservation, so are governmental funds, enabling key research into energy exploration.

Progress is being made in finding solutions to some of the many environmental and energy problems that face us today, but awareness still must be increased. Problems not yet recognized or encountered work against us. Current problems grow with the passage of time. Time is the ultimate enemy. Solutions must be found and implemented faster than the problems

continued on next page

Additional ILEED Interns

Jay Lewis
Mt. Vernon Township High School
Mt. Vernon, IL

Michael Connolly
J. Sterling Morton West High School
Cicero, IL

Erin Salisbury
Guilford High School
Rockford, IL

Adam Barnal
Holy Cross High School
River Grove, IL

Eric Cochran
Martinsville High School
Martinsville, IL

Latonya Jones
Luther High School
Chicago, IL

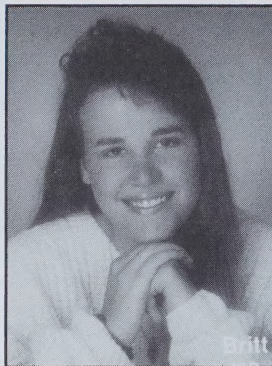
ILEED interns *continued from previous page*

Pletsch, *continued*

mount. The environment is quickly degraded, but very slow to recover. Propaganda and information availability must remain and increase. Pro-environmental production and consumption must continue and increase. Governmental funding for research must continue and increase. Involvement in programs such as the ILEED Energy Intern Program is key to finding solutions, for these programs increase awareness and encourage problem solving by the generation ultimately responsible for the environment in years to come. This also increases the probability that similar programs may be developed, further increasing awareness and serving as a catalyst for the action so necessary in this area. ◉

Britt Forrer
Plano High School
Plano, IL

In the many problems facing our generation, the care for our earth is one of the greatest. In the upcoming years it will be essential to develop new technology that will not harm the environment, as well as help reverse the harm already done. Finding a solution will be difficult, but the first step will be to bring environmental issues into classrooms at all levels. Students should take part in projects developing and using their original ideas to help the environment. They should be aware of what is currently being



Forrer

done, what has worked, and what has not, to develop new technology and improve the quality of the environment.

Many may be inspired to become more involved. Interaction with local groups and mentors should be promoted to allow students to feel more a part of an important motivation force in the environmental

issue. Our earth is precious, and any action for its good is positive; by first helping our students and future citizens realize the seriousness of the environmental issue, we will be securing our future. ◉

These students were not chosen to be interns, but the selection committee felt their essays to be exceptional and worthy of publication.

Peter Dreler
Aurora West High School
Aurora, IL

So many giant environmental problems face our generation that I find it impossible to pick a "worst" one. The world's rain forests are being destroyed at the rate of 67 acres a minute. The vast prairies of the Midwest have all but been annihilated. The population of Los Angeles gags on smog 365 days a year. So many problems exist; so many problems need solving.

The solution is people. Most people simply transcend realization of the critical condition of our environment. In a government by the people and for the people, the only way to instigate change is to educate the people and inspire the people. Recycling is an important step, but why recycle? Should we only recycle aluminum cans because they pay the most? Maybe

the best way is to replace perfume samples in magazines with a little "Eau de Landfill."

In a civilization where money is the ultimate endeavor, the environment must become a prosperous industry. Environmental careers are beginning to infiltrate the market already. But few are available and they don't pay well. Our generation has to remedy this situation, so that instead of working in a factory making pollution-belching automobiles, we can work in a factory manufacturing solar panels.

But we must start at the beginning. Rebuilding native prairies and replanting woodlands, protesting polluters and stopping destroyers, and recycling garbage and cleaning air are all good beginnings.

My solution: Just do it. ◉

Jennifer Kuchnicki
Alton High School
Alton, IL

The greatest problem facing my generation affects both energy and the environment, and that problem is public ignorance and laziness. We have the minds and the resources to find safe energy alternatives, and we have the ability to recycle almost everything we throw away, but people are not always willing to work for the answers. With the current generations, conservation is a learned habit. People have to conscientiously think about what they are doing. Many people do not bother to recycle because it is sometimes inconvenient. This is a very widespread problem, but the solution is not very complex.

First, we have to make conservation and recycling a natural, inborn habit. That means that we have to start with our babies. No one is too young to learn not to waste. In schools, all teachers have to teach conservation to students and serve as role models for them. Schools should have programs set up to help children learn to recycle wherever they are. The government must make recycling more accessible and convenient to citizens.

Lastly, industry, supported by the government, must commit to using recycled products, reducing waste and using good energy sources. With all of these goals met, people will no longer consider it a chore to conserve and recycle, and our world will be a much cleaner, healthier place. ◉

Energy Alternatives

Ethanol special feature of permanent fair exposition

This year's Illinois State Fair featured a new exhibit called the *Illinois Ethanol Exposition*.

The exposition is housed in a new 66'x120' building constructed by the Morton Building Company. Located across the street from the Lincoln Stage, the new structure is a permanent addition to the state fairgrounds.

The *Illinois Ethanol Exposition* provided a great opportunity for visitors to learn about ethanol and its usefulness as an energy source. The exposition was sponsored by the Illinois Corn Growers, the Illinois Department of Agriculture, the Illinois Department of Energy and Natural Resources, and the Illinois ethanol industry.

The project was part of an overall effort to establish a large annual agribusiness trade show at the state fair. According to the Department of Agriculture, the trade show will showcase the Illinois agriculture industry as it relates to national concerns of the agricultural community and the general public.

Current plans include featuring the Illinois ethanol industry in the building for at least the next three years. The future of ethanol fuel is the most important issue today for the Illinois Corn Growers and numerous other agricultural groups. Illinois is the leading state in the country in both the production and use of ethanol fuel. Approximately 500 million gallons of ethanol are produced annually in Illinois by Archer Daniels Midland Inc., Pekin Energy Company and Midwest Grain Products Company.

Illinois has taken a leadership role in supporting research to reduce the cost of

producing ethanol fuels and developing and demonstrating new engine technologies to use 85 percent to 95 percent ethanol fuel blends. ENR is working with the Greater Peoria Mass Transit District to test and demonstrate buses that operate with ethanol engines.

nois ethanol industry, ENR, the University of Illinois and the Vienna Correctional Center also developed exhibits for the exposition.

During the fair, representatives from exposition sponsors were present to answer questions and provide information

about ethanol and various demonstration projects. A media and information kiosk located at the center of the building is used to publicize the exhibits.

Right now, more than 30 percent of the gasoline sold

The *Illinois Ethanol Exposition* symbolizes the spirit of cooperation among farmers, agri-industries, transportation companies and the state of Illinois in promoting a product with multiple benefits.

The 14 ethanol-powered buses, with engines specially designed by the Detroit Diesel Corporation for ethanol use, were delivered to the city of Peoria in August.

Another project that features the same ethanol engine involves testing and demonstrating four over-the-road trucks owned and operated by Archer Daniels Midland Inc. The trucks run on 95 percent ethanol (E-95).

The state of Illinois fleet of 12 E-85 variable-fueled Luminas is now operational. (See story on page 1.) ENR, in cooperation with the Illinois Department of Central Management Services, will test and demonstrate this fleet of original factory-manufactured automobiles optimized for ethanol fuel. These variable-fueled vehicles can operate on any combination of 100 percent gasoline to 85 percent ethanol. A sensor in the fuel line determines the blend of fuel and adjusts the injection and control system accordingly.

In addition to these projects, General Motors Corporation, Detroit Diesel Company, the Illinois Corn Growers, the Illi-

in Illinois contains 10 percent ethanol, which amounts to 150 million gallons of ethanol per year. More than 200 million bushels of corn are used annually in production of fuel ethanol in Illinois. It is estimated that this demand for corn adds 4 cents to 5 cents per bushel to the price Illinois farmers receive for their product. The ethanol industry in Illinois represents more than \$1 billion in plant and equipment investment and directly or indirectly employs 5,000 people in the production of ethanol.

A 10 percent blend of ethanol has proven to be an excellent extender for gasoline and an excellent substitute for lead for increasing octane levels. A 10 percent blend of ethanol with gasoline also serves as an oxygenate, which makes gasoline burn cleaner. Ethanol can reduce carbon monoxide emissions by up to 20 percent in gasoline-powered vehicles. This is especially important for wintertime use when carbon monoxide emissions can become serious problems in many areas of

continued on next page

ENR programs to stress environmental/economic issues

The Illinois General Assembly has passed a fiscal year 1993 budget of \$90.8 million for ENR. The budget includes an overall decrease of \$5.4 million in general revenue funds (GRF), a reduction of 24.8 percent from fiscal year 1992.

Earlier this year, ENR and the Governor's Office had proposed \$17 million in GRF moneys to operate the department, a 21.8 percent decrease from the previous fiscal year. The House of Representatives later proposed additional cuts of

\$1.5 million from the department's budget. However, due to the diligent efforts of numerous ENR supporters, about \$775,000 was restored and earmarked for the Illinois scientific surveys and the Hazardous Waste Research and Information Center.

The GRF budget shortfall will lead to significant cuts in various department programs and operations. However, work involving major environmental and economic issues will continue. FY93 program priorities include global warming, solid and hazardous waste management, Illinois coal technology and marketing, ethanol, and research to help the state comply with the Clean Air Act Amendments.

Even with the reduced budget, the department will be able to fund \$4 million in improvements at Dickson Mounds Museum near Lewistown from the Capital Development Bond Fund. Private foundation donations will also enable museum art galleries in Lockport and Chicago, previously slated for closure, to remain open.

ENR is also providing \$5.9 million in Coal Development Bond funds to enable Illinois Power Company to construct two

scrubbers at the Baldwin Power Station. The money is the first installment of a \$35 million grant to the utility. The scrubbers will enable Illinois Power, the largest instate user of Illinois coal, to comply with the new Clean Air Act amendments. The grant will help the state retain an estimated 2,500 coal industry jobs.

The FY93 budget for the department includes \$16.4 million in general revenue funds; \$34.1 million for coal, alternative energy, and oil and gas research and demonstration; and \$10.5 million in federal and oil overcharge funds to administer various energy programs.

A total of \$24.4 million will be used for solid waste initiatives, such as grants for recycling and market development projects, research and technology demonstration, used tire management and school education.

Another \$2.6 million in Horse Racing Tax Allocation funds is earmarked for distribution to specific museums, aquariums and park districts. In addition, \$2.8 million is appropriated from various funds for research and related activities. **bc**

Ethanol exposition

continued from previous page

the country.

The passage of the 1990 Clean Air Act held great promise for ethanol-blended fuels as a clean-burning alternative fuel. Since passage of the Act, however, regulations have been proposed that limit the use of ethanol in reformulated gasoline for ozone nonattainment areas. The regulations limit the vapor pressure of gasoline in ozone nonattainment areas to reduce emissions resulting from evaporation of the fuel. A 10 percent blend of ethanol increases the vapor pressure of gasoline by one pound per square inch. If the reformulated gasoline sold in the ozone nonattainment areas already has a vapor pressure at the maximum allowed for the area, then ethanol will not be allowed to be blended with the gasoline.

Studies are currently being conducted to show that while a 10 percent blend of ethanol increases vapor pressure of gasoline, it does not increase ozone because ethanol is less reactive. Work is being done by the ethanol industry and the various farm groups to make sure the clean-burning properties of ethanol are realized and that ethanol will be recognized in implementation of the Clean Air Act.

When 10 percent ethanol-blended fuels are allowed into reformulated gasoline for ozone nonattainment areas, ethanol producers will expand their production capacities and the demand for corn will also increase, providing tremendous economic benefits for Illinois and its agricultural economy. **ak**



Illinois State Museum photo

The Lockport Gallery, previously slated for closure due to lack of state funding, will remain open and will operate on private donations from the Donnelley family and the charitable funds they have established. The gallery, a branch of the Illinois State Museum, is housed in the historic Gaylord Building in Lockport, Illinois.

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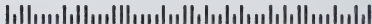
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Resource Bookshelf

Illinois Coal Mining Costs, ILENR/RE-PR-92/01. Free.

This is a continuation of three previous studies concerning the production, consumption and transportation of Illinois coal. The first study detailed Illinois coal production and resources, providing a database on Illinois coal production since 1960 and information on the top 10 producers. The second analyzed the utility demand for Illinois coal from a historical perspective and provided a database on the utility industry. The third study provided the final link between the supply and demand of Illinois coal, describing the various modes of transportation, an overview of the carriers, and the transportation costs.

This fourth study provides a database on the physical and operating characteristics of coal mining, determines the weighted average costs of production for underground and surface mines in Illinois, and examines the major variables that influence the cost of mining coal.

A Guide to Indoor Air Quality for Home Weatherization Practitioners, ILENR/RE-ER-91/04. Free.

The adverse health consequences of exposure to common indoor pollutants range from irritation or allergic reactions to cancer or death from acute overexposure. Weatherization directly affects indoor air pollution. Consequently, the weatherization assistance professional is in a unique position to assess and improve air quality problems in the home. No other public service professional has such access to the home or such experience with the factors contributing to indoor air pollution.

This guidance document is intended primarily for the weatherization professional involved in weatherization assistance programs for low-income households. Those interested in the relationship between weatherization, indoor air quality, and practical measures for reducing indoor air pollution will also find this document of interest.

Mobile Source Emissions Inventory Development, ILENR/RE-AQ-91/05. Free.

This study was undertaken to develop a methodology for preparing a 5km by 5km areal gridded mobile source emissions inventory for areas of Illinois that are in nonattainment status regarding National Ambient Air Quality Standards. The methodology developed here was applied to one pollutant in one test case county in Illinois. Hydrocarbon emissions from mobile sources in Kane County are the focus of the study. Among the products of this project is a preliminary 25-km² gridded mobile source hydrocarbon emissions inventory for Kane County. Numerical results, as well as a color-correlated overview map of the countywide gridded emissions inventory, are provided in this report. Recommendations for improving this methodology and further developing gridded mobile source emission inventories for other Illinois counties are also provided.

Remote Sensing Enhanced Motor Vehicle Emissions Control for Pollution Reduction in the Chicago Metropolitan Area: Siting and Issue Analysis, ILENR/RE-AQ-91/15. Free.

This report describes three specific scenarios for implementation of remote sensing to enhance inspection and maintenance programs for controlling motor vehicle emissions. Screening at centralized stations, mobile sensors, and modular fixed sensors scenarios describe the range of potential applications of a Fuel Efficiency Automobile Test (FEAT) remote sensor to motor vehicles emissions control. A combination of two or all three scenarios would be most effective in identifying high mileage gross polluting vehicles. The preliminary implementation framework of each scenario is described for the purpose of this work to contribute to the development of acceptable plans for the further reduction of emissions from vehicles in the Chicago metropolitan area. Remote sensing of vehicle emissions to identify the small percentage of vehicles responsible for most of the motor vehicle pollution can contribute to an efficient and effective air pollution control strategy than can be implemented.

A Guide to Inventorying and Managing Forestry Resources in Small Communities, ILENR/RE-WR-91/13. Free.

There are 1,279 incorporated communities in Illinois, many of which are small rural communities with populations under 1,000. Although technical assistance with community forestry programs are available through public and private sources, it is not often directed to the needs of small communities.

Directed to community leaders, this guide will help them focus on current public and private programs. It provides a framework and outlines a process for the development and implementation of realistic forestry resource management plans. The guide contains numerous references for assistance, sample ordinances and standards, and a case study.

Illinois Department of Energy and Natural Resources, FY 1991 Annual Report, ILENR/IS-87/03(FY91). Free.

The research and accomplishments of ENR's 1991 fiscal year are highlighted in the department's annual report.

These publications are available through the ENR information clearinghouse, 1-800-252-8955 (in Illinois), 217/785-0310 (out of state), or the National Technical Information Service in Springfield, Virginia, 703/487-4650.

Recycling grants *continued from page 5*

be used by grant recipients to purchase recycled-content products.

Since 1987, more than \$9.6 million in grants has been awarded to 255 projects. □

Primary Processing

| | | |
|---|------------|-----------|
| Pekin Recycling Center | Processing | \$ 95,858 |
| Henry County Orbital Recycling Program | Processing | 21,800 |
| Roy Strom Refuse Removal Service, Inc., Maywood | Processing | 100,000 |
| Belleville Recycling, Inc. | Processing | 100,000 |
| Hughs Industrial Services, Inc., Springfield | Processing | 100,000 |
| Metro/Great Lakes, Blue Island | Processing | 100,000 |
| Jamieson Community Center, Monmouth | Processing | 94,200 |
| Homewood Disposal and Recycling Services, Inc., East Hazel Crest | Processing | 100,000 |
| Midstate Salvage Corporation, Taylorville | Processing | 51,382 |
| Okaw Valley Recycling Center/ D & B Refuse, Inc., Sullivan | Processing | 100,000 |

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REUSE
RECYCLE



- Buy concentrates and products in bulk
- Leave grass clippings on your lawn and compost other yard waste
- Buy products made from recyclable materials that are collected in your community
- Find new uses for throwaway items—donate clothing and household items to people who can use them

Recycled newsprint *continued from page 2*

all Illinois newspaper publishers to obtain information on their newsprint use. The efforts resulted in information provided by 575 newspapers; 182 newspaper publishers were identified as nonreporters. The majority of nonreporters are small, weekly newspapers that represent less than 1 percent of the total newsprint consumed in Illinois. □

Illinois Resources

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Illinois Resources



Illinois Department of Energy and Natural Resources May/June 1992



Department will focus on priority needs

ENR to face reductions from FY93 budget proposal

Governor Jim Edgar has requested appropriations for ENR totaling \$76.4 million for fiscal year 1993, an overall 19 percent reduction from its authorization for fiscal year 1992.

The department will receive \$4.7 million less in general revenue funds, a decline of 22 percent from the current fiscal year.

The budget reductions will result in the closure of art galleries in Lockport and the State of Illinois Center in Chicago. Even with the reduced budget, however, the department will be able to fund proposed improvements at Dickson Mounds Museum and provide funds to help the state save coal mining jobs.

"The department will focus on priority

research and planning needs of state government that are important to the state's economic rebound and scientific stature," ENR Director John S. Moore said. "The galleries are being closed rather than making additional staff and program cuts at the main museum facility in Springfield and the Dickson Mounds Museum near Lewistown.

"The decline in available state funds also means ENR must eliminate certain programs and staff positions and reduce the level of research in all program areas," Moore added.

In addition to decreased general revenue funds, the drop in the FY93 budget for ENR is primarily due to lower appro-

priation levels from other sources of revenue, such as the Petroleum Violation Escrow Fund, the Coal Development Bond Fund and the Solid Waste Management Fund.

ENR program priorities involve major environmental and economic issues, such as Illinois coal technology and marketing, global warming, research to help the state comply with the Clean Air Act amendments, and improving solid and hazardous waste management. ENR will continue to emphasize scientific issues important to the state and the preservation and enhancement of Illinois' natural resources.

JUN 12 1992

Conservation champion Gaylord Donnelley dead at 81

Gaylord Donnelley, former chairman and president of the Chicago-based printing company of R. R. Donnelley & Sons, died at age 81 on April 19 at his South Carolina winter home.

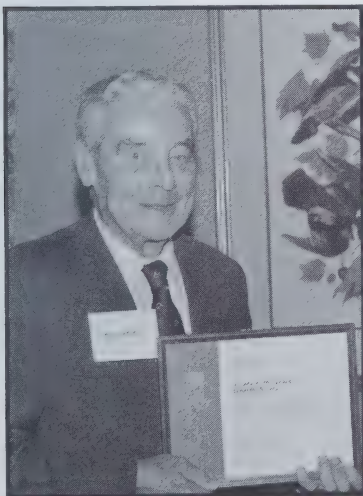


Photo by Tom Hecht, ENR

Mr. Donnelley retired in 1975 from the world's largest commercial printing firm, founded in 1864 by his grandfather, but had continued as honorary chairman and president. He served on numerous advisory boards and in leadership positions for national and international conservation and wildlife organizations, including Ducks Unlimited, The Nature Conservancy, the North American Wildlife Foundation, the National Recreation and Parks Association, the Illinois Nature Preserves Commission, and the Illinois Department of Conservation.

Donnelley also was chairman of the board of the Nature of Illinois Foundation, a not-for-profit corporation he helped form in 1983 to foster an understanding of and appreciation for the natural resources of Illinois and to promote the activities of

ENR's scientific surveys and the Hazardous Waste Research and Information Center.

"Illinois has more than 100 years of data and employs hundreds of scientists. Our role as we see it is to help make the state's efforts in the scientific area more useful to the public," Donnelley commented on the role of the Nature of Illinois Foundation.

Donnelley believed the work of the Surveys is essential to the state's conservation efforts. "So much time, money and effort are often expended by people who really don't have a sound basis in fact. That's why our efforts should be to bring a scientific basis to what we do."

Equally at home outdoors as in the boardroom, Mr. Donnelley was a lifelong philanthropist and conservationist. Deeply interested in wildlife, hunting, and fishing, he believed recreation opportunities should be available to everyone. A native Illinoian and longtime resident of Libertyville, Donnelley and his wife Dorothy had worked to use open space for the

As chairman of the Nature of Illinois Foundation, Gaylord Donnelley accepted the 1990 merit award of the National Soil and Water Conservation Society. The foundation was cited for several achievements, including its promotion of understanding and stewardship of Illinois' natural resources through its magazine, The Nature of Illinois.

continued on page 5

Chicago and southern Illinois economies at risk

By 1995, the state of Illinois may lose more than one-third of its coal business, 23,000 jobs, \$900 million in personal income, and \$50 million per year in state tax revenues, according to a report from the Illinois Coal Development Board.

These findings are the apex of the board's annual "Outlook for the Illinois Coal Industry," which was presented to Governor Jim Edgar and the Illinois General Assembly with recommendations for preventing economic damage to the state. The 182-page report attributes the majority of its observations to economic fallout from the amendments to the federal Clean Air Act of 1990.

The first phase of the revised federal laws, which will take effect in 1995, establishes caps on sulfur dioxide emissions from coal-burning utility companies in the United States. Phase II, which will begin in the year 2000, tightens regulations on coal-burning utilities by putting restrictions on emissions of nitrogen oxides and further restricting sulfur dioxide emissions.

Illinois presently is the fifth leading coal-producing state in the nation. But that ranking, which is based on sales volume, is expected to diminish during Phase I of the new laws. Most Illinois coal is high in sulfur, and power plants that burn high-sulfur coal must reduce their emissions of air pollutants such as sulfur dioxide and nitrogen oxide, reductions targeted by the Clean Air Act amendments.

"The Illinois coal industry will experience a severe erosion of its customer base due to compliance actions," cites the report. Anticipated loss of annual coal sales is projected at \$575 million. Currently, more than two-thirds of Illinois' coal volume is exported to 38 out-of-state utilities. According to the coal board report, 19 of

those utilities have opted to switch to low-sulfur coal, while 11 may build emissions scrubbers.

Consequently, the report predicts the demise of one-third of the state's utility coal market by 1995. Further, the lapse in business could trigger the shutdown of 16 of the 40 underground and surface coal mines that were operating in Illinois at the time of the coal board report.

By far, the traditional "coal country" region of southern Illinois is expected to bear the brunt of the economic hardship, with the loss of nearly 9,000 jobs by 1995. In southern Illinois, "the human toll on dislocated miners, their families and many others will be heavy," concludes the report.

The Chicago region in northern Illinois will be hit substantially as well. Economic aftershocks will hurt Chicago and surrounding counties, which could lose more than 7,000 jobs due to the drop in Illinois coal sales. The coal board report predicts a ripple effect that will shake out

Chicago-area jobs indirectly related to coal mining.

To hedge against the economic impact, in particular \$50 million per year of lost state tax revenues by 1995, the report recommends tax credits for Illinois coal producers and consumers who invest in capital projects that ensure the use of Illinois coal, extension of job retention rates to coal producers adversely affected by Clean Air Act implementation, the creation and trading of allowances

to meet future power needs, voluntary pooling arrangements by Illinois utilities to obtain extension allowances, and the adoption of a market-oriented technology development policy to promote future coal use that is environmentally sound.

As further leverage against predicted slides in the coal business, the Illinois Coal Development Board recommends adding fuel to the state's pursuit of clean coal technologies. Since the clean coal initiative was conceived by Illinois in 1978, the state has supported 20 demonstration projects and attracted more than \$1 billion in research and development funding from state, federal and private sector sources.

According to the coal board, goals of the Illinois clean coal technology program should focus on environmentally acceptable means of meeting existing and future energy and environmental regulations, along with an emphasis on technologies that provide lowest cost energy. □

July 1 deadline set for tank registration

Until now, heating oil tanks have not been required to be registered. Beginning July 1, 1992, however, any tank that contained heating oil between January 1, 1974, and July 11, 1990, must be registered with the Office of the State Fire Marshal. Heating oil tanks registered before July 1, 1992, must pay a registration fee of \$100. Heating oil tanks registered after July 1, 1992, must pay a registration fee of \$500.

The Illinois Underground Storage Tank Fund provides financial assistance to registered underground storage tank operators and owners for the costs of cleaning up contamination caused by chemicals released from their tanks. Formerly reserved primarily for service station gasoline tanks, changes in the law expanded the fund's coverage to include owners and operators of heating oil underground storage tanks.

The amount of reimbursement from the fund to cover the costs of corrective action is determined by the registration date of the heating oil tank. The costs incurred involving heating oil tanks registered before July 1, 1992, will be reimbursed in full after a deductible of \$10,000. If tanks are registered after July 1, 1992, a \$100,000 deductible will be applied, providing reimbursement to operators or owners only after they spend \$100,000. Failure to register your tank with the State Fire Marshal before July 1, 1992, may be a costly mistake. □



Safe drinking water one benefit of groundwater protection

"Nearly 97 percent of Illinois rural residents and three-fourths of the state's cities rely upon groundwater for their water supplies. We must do everything possible to protect the state's 10,000 public water supply wells and 400,000 private wells," said Governor Jim Edgar in proclaiming May as Groundwater Protection Month in Illinois. Groundwater protection involves the maintenance of land around wells and careful handling of hazardous materials. The Illinois Groundwater Protection Act and other laws have established well-head protection zones, mandated groundwater research and monitoring programs, increased the powers of local governments, and made provisions for educational programs. To help prevent groundwater contamination, all well owners should survey the areas around their wells for potential sources of contamination.

Probably the words heard most frequently by a chemist or a lab manager when a well owner brings in a sample of water to be tested are, "I just want to know if it's safe!" These days, people are highly conscious of their health and what they are consuming. They want to know that their air, food and water supplies are free of contaminants that could change or shorten their families' lives.

Of the wells in Illinois, 98 percent are privately owned supplies. Folks who get their drinking water from a public water supply may not have to worry quite as much about their water quality as those who have a well in their backyards. Public

water supplies are regulated by federal and state standards. When these standards are not met, the utility is required to notify its customers of the problem. However, the 1.3 million Illinoisans who drink from their own wells have to take the responsibility for checking their water quality themselves. How do they decide whether their water is contaminated or not? How much contamination can they allow in their well water before they must be concerned about it? And where is the contamination coming from, anyway?

How does water become contaminated? One definition of contamination may be that which makes the water unfit

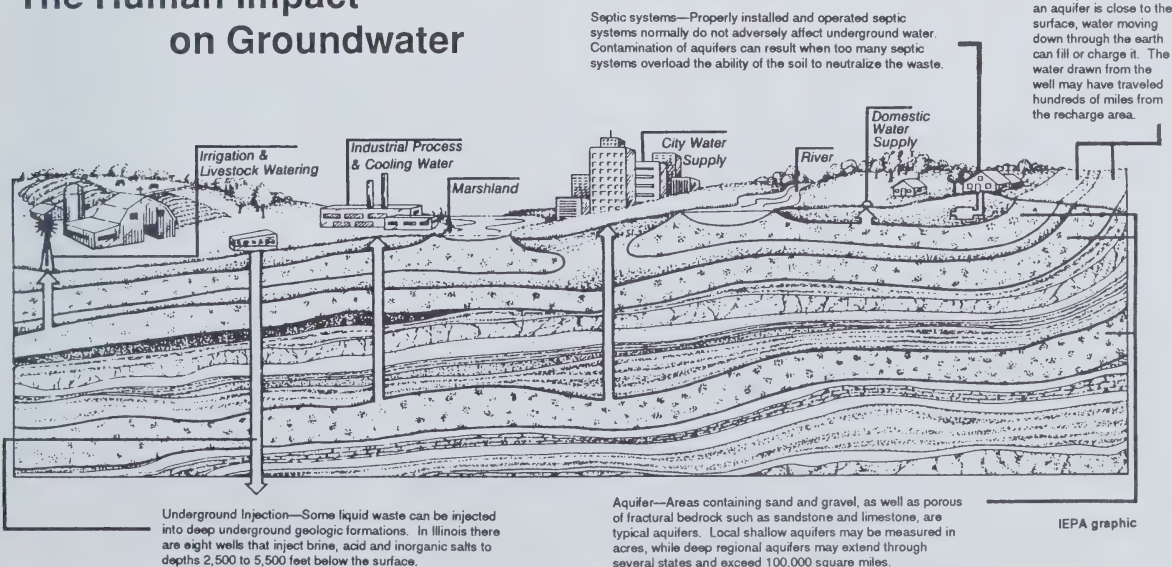
for a particular use. In the case of drinking water, a contaminant would be anything that makes the water unpleasant or unhealthy to consume. Bad odors or tastes can make the water unpleasant. Nobody enjoys drinking water that smells like rotten eggs or tastes salty or bitter. On the other hand, some contaminants that cannot be seen, smelled or tasted can be a danger to health. Many bacteria, trace metals, organics, etc., can go undetected by human senses but can cause sickness or even death.

Contaminants can be found in water due to human activities, or may occur in water naturally. As rain water seeps into the ground it dissolves minerals and nutrients from the soil and rocks. Anything that is normally found in the earth's geology can end up in well water. Likewise, anything that has been spread upon the earth's surface or buried in the soil by man can also be picked up by rain or surface water and end up in the well water.

What are some examples of contaminants? The Federal Safe Drinking Water Act (SDWA) limits the kinds of contaminants and the amount of the contaminant that are allowed in public water supplies. The Environmental Protection Agency has also issued health advisories for some con-

continued on next page

The Human Impact on Groundwater



ENR sponsors Springfield Earth Day observances

In celebration of Earth Day on April 22, ENR and the Illinois Department of Central Management Services sponsored a collection of newspapers, magazines and catalogs in the parking lot of the Capitol Complex Visitor's Center in Springfield.

Employees from both departments worked at the drop-off site from 7:30 a.m. until 6 p.m. to load the two semitrailers. Tons of materials were delivered by hundreds of people who took advantage of the opportunity to help the environment and save precious landfill space.

A total of 21.38 tons of newspaper and 9.75 tons of magazines and catalogs were collected during the 10 and one-half hours. FSC Paper Company of Alsip, Illinois, will process the newspapers into newsprint and the magazines and catalogs into tissue products.

ENR also pooled its resources with the Illinois Environmental Protection Agency and the departments of Agriculture and Conservation to celebrate Earth Day with 500 Springfield area 4th-grade students at the Illinois State Fairgrounds.

The day-long program included ac-



Photo by Danny McFarlin, ENR

ENR employee Bob Casteel stacks another load of newspapers into the FSC Paper Company semitrailer. More than 21 tons of newspaper and almost 10 tons of magazines and catalogs were collected during the Earth Day observance in Springfield.

tivities demonstrating good stewardship of our natural resources and a tree-planting ceremony in Conservation World. ENR

staff members demonstrated the process of papermaking and allowed each student to make a small sheet of paper to take home. □

Groundwater and safe drinking water *continued from previous page*

taminants that may not be regulated by the SDWA.

These two resources provide good guidelines for evaluating the private well water of rural residents. Some of the contaminants are measured in milligrams per liter (mg/l). An equivalent expression is parts per million (ppm). Other contaminants are measured in micrograms per liter (µg/l), also known as parts per billion (ppb).

1 mg/l = 1 ppm; 1 µg/l = 1 ppm = 1,000 ppb
1 ppb = 1 drop of water in 13,210
gallons of water
(equivalent to a 24' x 4' round swimming pool)

Contaminants that can be found naturally in water include radon gas and radium. These are products of radioactive decay and are known to be carcinogens. Some trace metals occur in nature—arsenic, barium, cadmium, mercury and silver can be found in geologic formations and may affect the nervous system, the

circulatory system and some organs. Coliform bacteria are indicators of the sanitary quality of water. Although these bacteria are found almost everywhere, their presence in well water indicates possible contamination by organisms that can cause stomach and bowel problems, as well as typhoid fever, cholera and other diseases.

Although nitrates can be found naturally in well water, any amount near the SDWA limit of 10 ppm as N is usually due to the action of man. Large amounts of nitrates in water are probably due to nitrogen fertilizers or to human or animal wastes. Infants are most susceptible to nitrate poisoning, which can cause methemoglobinemia. Pesticides spread by man can work their way into groundwater and cause nervous system and organ disorders. Solvents and cleaning agents such as benzene and carbon tetrachloride might contaminate well water from leaking storage drums or improper disposal and are possible carcinogens. Lead in drinking water can cause nervous system damage and is usu-

ally due to corrosion of plumbing system materials.

People are not the only creatures concerned with safe drinking water. Livestock and pets need water free from contaminants if they are to survive and reproduce. Rural water well users must take the initiative to see that they protect their water supply from contamination and must routinely make a check of their well water quality. These actions will help ensure that they are not jeopardizing their health or livelihood.

For more information, request a copy of *Safe Drinking Water: Testing and Treating Home Drinking Water* from your local Cooperative Extension Service Office or contact your local health department. bk

Brian Kaiser is a chemist with more than 10 years' experience in analyzing water quality in the Public Service Laboratory at the Illinois State Water Survey, 2204 Griffith Drive, Champaign, IL 61820 (217) 333-9234.

Nature of Illinois Foundation chairman *continued from page 1*

benefit of the public by donating 326 acres to help create Oak Prairie Preserve in Lake County. They also donated land to create the Donnelley-DePue State Wildlife Area on the Illinois River in Putnam County; 63 acres to be used as an Illinois nature preserve; and more than 6,600 acres, with an additional 10,000 acres placed in conservation easements that ban development, from their Ashepool Plantation to protect the 350,000-acre estuary formed by three rivers immediately south of Charleston, South Carolina.

The Donnelleys' property donations include a Marion County farm purchased and donated nearly 30 years ago to establish the state's Marion County Prairie Chicken Sanctuary near Kinmundy.

Donnelley also led the efforts to designate the Illinois and Michigan Canal Corridor as the nation's first linear park. The project included restoration of the

Reagan and the Gaylord Building is now the I & M Canal visitor center.

Donnelley was a recipient of the Order of Lincoln Award. The award is presented by the state of Illinois "to honor individuals whose contributions to the betterment of mankind have been accomplished in or on behalf of the state of Illinois, or whose achievements have brought honor to the state because of their identity with it, whether by birth or residence, or by their dedication to those principles of democracy and humanity as exemplified by the great Illinoisan whose name we bear."

Gaylord Donnelley, another great Illinoisan, will live on through the tremendous legacy of conservation he has left for his native state and the world. ■

"Your commitment to the environment spans many years, and your generosity and leadership have my respect and admiration.

Not only do you represent the finest in the 'points of light' concept, but your commitment to our precious environment has few, if any, peers."

—President George Bush

Gaylord Building in Lockport, a former dry goods store once operated by Donnelley's grandfather. The restoration earned a presidential citation for historic preservation from former President

Dickson Mounds Museum closes Indian burial exhibit

On a blustery spring day in central Illinois, the staff of Dickson Mounds Museum permanently closed the museum's burial exhibit to public view, finally laying to rest the controversy over the display of Indian skeletal remains that had embroiled the museum for more than two years.

More than 3,000 visitors toured the museum on April 3 to get a last look at the burial site. Nearly 10,500 curious traveled to Fulton County during the last week the 900-year-old Indian cemetery was on display.

Native Americans who had worked since early 1990 to close the exhibit were on hand for the closure. They gathered around a bonfire on a hill next to the museum at sunrise and conducted a pipe ceremony in celebration of the occasion.

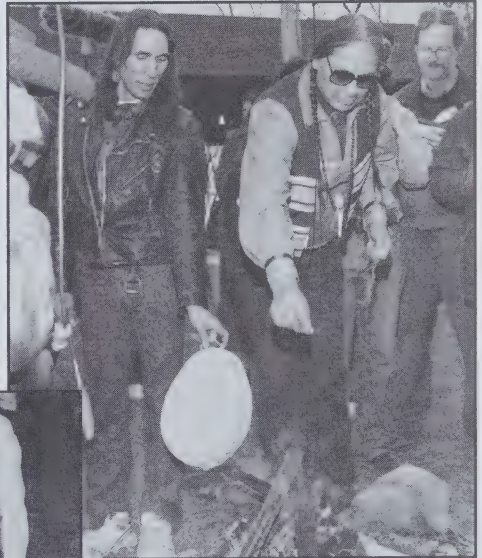
"Our sacred lands are where the bones of our ancestors lie," said Michael Haney of the American Indian Movement as he led the Indian burial ceremony. The group then processed to the museum and placed a tombstone replica to symbolize the reburial.

The remains of the 237 Indian skeletons will be entombed by the state as part of a \$4 million museum rehabilitation

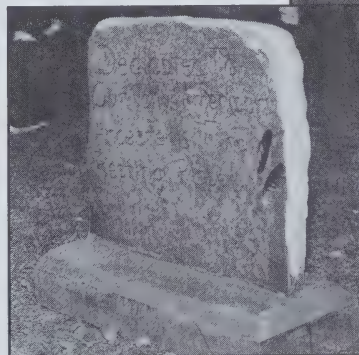
project to make Dickson Mounds "the educational tool we all want it to be."

Dickson Mounds Museum remains open to the public and continues to offer educational exhibits of archaeology, displays of artifacts, publications, and interpretive programs.

This national historic site, located near Lewistown, is open from 8:30 a.m. to 5 p.m. daily, except some holidays. There is no admission charge. □



Michael Haney (right) of the American Indian Movement sprinkles sage into a campfire as part of an Indian burial ceremony that preceded the closing of the Indian burial display at Dickson Mounds Museum (above). A symbolic tombstone marks the official closing of the display (left).



Illinois Rivers Appreciation Month sets aside time to reflect

Whereas May is celebrated as Groundwater Protection Month, June is designated as Illinois Rivers Appreciation Month. Illinois residents are reminded to take time to reflect on the vital importance rivers and streams play in our everyday lives.

The 13,000 miles of rivers and streams flowing through the state play an integral role in the water cycle, providing a major source of industrial and residential water supply and recharging the groundwater resources relied upon by more than four million Illinois residents.

Illinois' history, growth and development as a state is unquestionably tied to the rivers that flow through and around it. These waterways provided explorers such as Marquette, Joliet and LaSalle with a navigable system to further their journeys. Forts and early cities first sprang up along the water transportation systems, taking advantage of reliable access to distant meccas of commerce.

Rivers and streams provide not only

transportation, but also energy and food supply sources, water purification and flood absorption systems, wildlife habitats, and endless recreational opportunities.

Rivers and streams constitute some of the most valuable resources in Illinois, vital to our quality of life and economic well being. However, in our often frenetic quest to improve both economy and living conditions, Illinois waterways have suffered serious damage.

Many once-beautiful water systems have been polluted with human, industrial and agricultural waste and chemicals in the name of "progress." Channels are clogged with the effluent of commerce or rerouted, often forming rotting ditches and pools.

Many practices employed to achieve

increased agricultural production also cause increased erosion and siltation. Economic development often leads to dredging and altered flow patterns that create significant, sometimes irreversible, disruption to waterways.

Rivers and streams are not only vital for the enjoyment of human life, but provide the life-sustaining environment for fish and other aquatic organisms. Destruction of our natural water resources results in fish kills and harvested fish that are inedible, reduction in spawning grounds, and dwindling populations of waterfowl and fish that feed on organisms growing in the waterways.

Illinois Rivers Appreciation Month draws attention to the value of rivers and streams as a resource for Illinois. It offers an opportunity for residents to improve their awareness and appreciation of Illinois waterways. But it is also a time to take an active part in ending the abuses that threaten the existence of these water systems.

You can do something to undo the damage already sustained by Illinois waterways if you are willing to make the effort. Take an active part in this year's observance:

- Join friends or organizations to sponsor river activities—cruises, photography contests, festivals, boat and canoe races, cleanup campaigns, and fishing contests.

- Urge government officials to take action against pollution, destructive stream alterations and uses of waterways that result in damage to the aquatic system. Encourage public and private support for river protection and management.

- Adopt a stream or a river. Recreational use is good for the life of the waterway. Public interest in a river or stream increases the likelihood that it will be kept clean and unaltered.

- Promote the need for river and stream protection through the media.

- Begin a shoreline revitalization project. Clean up a riverside park area, launch site or other public recreational area connected to a waterway.

Illinois Rivers Appreciation Month generates interest in preserving and managing river resources. Illinoisans take time out to participate in special events on their favorite Illinois waterways.

Recreation is one of many benefits provided by Illinois rivers and streams. June is designated as a special month to remind Illinois residents of the beauty and value of these waterways and to inspire them to make a special effort to keep them clean and forever flowing.



the joys and responsibilities of our river resources



Take extra time this month to go fishing, boating, or just sit on the shore and enjoy the tranquility associated with rivers and streams. Setting aside a special month to focus public attention on the problems

faced by Illinois waterways is a necessary reminder, but keep in mind that year-round monitoring is required to achieve lasting solutions. ⁸⁵

Calendar of Events

June 19-21 Lockport Old Canal Days.

Activities include an opening day parade, live entertainment, 200 to 300 arts and crafts booths, wagon rides, a petting zoo, 10K runs, and walking tours. (815) 838-4744.

June 20 Ohio River Sweep.

A one-day cleanup in each Illinois county along the banks of the Ohio River. Volunteers receive free T-shirts. 1-800-359-3977.

June 20 4th Annual Kishwaukee River Cleanup.

The goal is to clean up the Kishwaukee River from Cherry Valley to the confluence at the Rock River. Volunteers will need a canoe or a flat bottom boat. (815) 963-0732.

June 20 10th Annual Kankakee River Cleanup.

The river is divided into seven sections for cleanup. Volunteers walk the banks or ride in fishing boats to pick up trash. Breakfast, lunch and Hardee's coupons are provided. (815) 935-7390.

June 21 Quad Cities Ride the River.

A family bike trip (20 miles) along the riverfront at Moline and Rock Island (8 a.m. to 4 p.m.), including a ferry ride across the Mississippi River on the Quad City Queen. 1-800-747-7800.

June 25-July 5 Quad Cities Great River Ramble.

This 10-day celebration of summer fun on the Mississippi River includes fireworks, parades, water ski shows, a cardboard boat regatta, and festivals, including the Mississippi Valley Blues Festival. 1-800-747-7800.

June 26-July 5 Kankakee River Valley Fishing Derby.

Enjoy 10 days of fishing in the largest and richest derby in the Midwest, all along the Kankakee River Valley. Prizes are awarded for the top three catches in any of eight species. 1-800-74-RIVER.

June 27-28 Dragon Boat Races.

Join in the excitement of paddling a 40-foot dragon-shaped wooden boat by organizing a group of 25 people for a racing crew. Races are held at Riverfront Park in Warsaw, Illinois. (217) 256-4235.

June 28-July 4 Mississippi Annual Down River Adventure by Canoe.

A week-long canoe adventure from Bellevue to Burlington, Iowa (153 miles). (319) 752-4142.

Plastics recycling gets a boost from coding system

Have you looked at the bottom of a plastic bottle lately?

Chances are you will find a code featuring a number inside a triangle. This code is a key element in a material identification code system that enables recyclers to separate plastic containers by different kinds of plastic resins. The coding system was developed in 1988 by the Plastic Bottle Institute, a division of The Society of the Plastics Industry.

This development is viewed as an important step in promoting the growth of plastics recycling. In recent years, recycling efforts have tended to focus on newspapers, aluminum and glass. As a result, many people are unaware that plastic containers and other plastic items are indeed recyclable. Furthermore, there is a growing demand from manufacturers for recycled plastic, which they can transform into new and useful products.

One of the major factors that has inhibited the growth of plastics recycling is the fact that "plastic" is a generic term covering a wide range of materials. These materials or resins have different chemical compositions and properties and are de-

items can be used, thereby necessitating sorting or separating before sale to firms that transform recycled plastics into new products.

However, several trends have had a significant impact on the increase of plastics recycling. One involves the impending landfill crisis. Plastics presently comprise 14 percent to 18 percent by volume of landfill space, with PETE and high-density polyethylene (HDPE) constituting the majority of the materials. A second trend involves efforts by several states to promote PETE recycling through deposits or buy-back programs. A third trend concerns efforts by trade associations and communities to conduct public awareness campaigns. As a result, more and more people are aware that plastic containers and packaging can be kept out of the waste stream, collected, processed and recycled.

Finally, there has been a major thrust

industrial strapping, and paint brush bristles, as well as for nonfood containers.

Coca-Cola's announcement last November that it would test market new 2-liter plastic bottles containing 25 percent recycled plastic generated considerable publicity and increased public awareness regarding landfill alternatives.

The Chicago Park District's "Plastics in the Park Program" uses plastic landscape timber manufactured from recycled containers. The Illinois Department of Conservation, in cooperation with the ENR Office of Recycling and Waste Reduction, has started purchasing new products made from recycled plastics. Boat docks in Conservation World at the state fairgrounds and picnic tables, railings, signage and privies at Illinois Beach State Park are made from recycled plastic lumber. A long-term goal is to collect recyclables at state parks and thereby begin the entire recycling process.

The examples cited here barely skim the surface in terms of how recycled plastics can be used. In fact, experts project thousands of potential applications. ENR has been assisting in this effort through its Market Development Financial Assistance Program. By providing grants and low-interest loans to Illinois firms, this program promotes the manufacture of new products from recovered materials.

At the same time, ENR has provided financial assistance to communities throughout the state for collection programs. Other communities are initiating collection programs and need the technical assistance ENR provides.

Illinois' progress in terms of plastics collection has advanced each year. For example, curbside programs in Chicago and the suburban collar counties serving more than 424,000 households are now collecting 288 tons of plastic per month.

These efforts are designed to promote balance between supply and demand as they relate to the growth of collection and marketing of post-consumer plastic items and other recyclable products. *ac*










Recyclable Products



Recycled Products

Plastic Container Code System For Plastic Bottles

| CODE | MATERIAL | TYPICAL PRODUCTS |
|---|----------|--|
|  1 | PETE | Polyethylene terephthalate (PET) |
|  2 | HDPE | High-density polyethylene |
|  3 | V | Vinyl/polyvinyl chloride (PVC) |
|  4 | LDPE | Low-density polyethylene |
|  5 | PP | Polypropylene |
|  6 | PS | Polystyrene |
|  7 | Other | All other resins and layered multimaterial |

signed for different purposes. For example, the resin polyethylene terephthalate (PETE) enables soft drinks to be packaged without losing carbonation. The different resins also affect how recycled

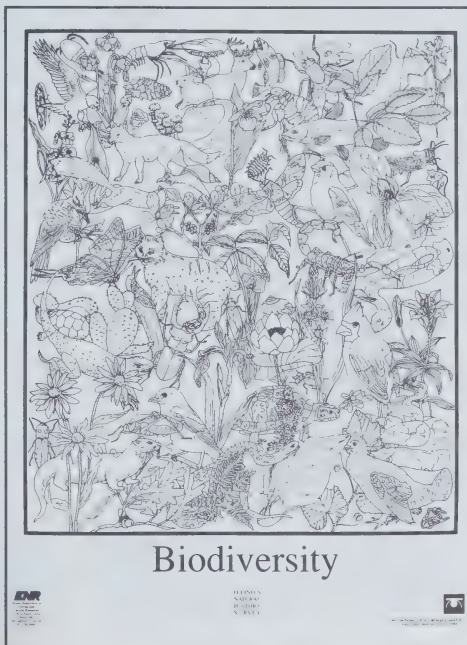
in recent years to develop new ways of using recycled plastics. Recycled PETE can be used in a variety of fiber applications, such as fiberfill for sleeping bags and clothing, carpet yarn, automobile parts,

Natural History Survey offers educational posters

A 17" x 22" *Biodiversity* poster suitable for coloring is available from the Illinois Natural History Survey. More than 60 plants and animals native to Illinois are pictured.

The poster is appropriate for elementary and junior high school science classes, nature centers, and such other ecology-oriented groups as 4-H clubs and Scouts. Educators can design numerous activities around the poster, including identifying the organisms and grouping those that are closely related (taxonomy), categorizing those that are aquatic vs. those that are terrestrial (habitat preference), or merely acquainting students with the astonishing diversity of plants and animals that live in our state.

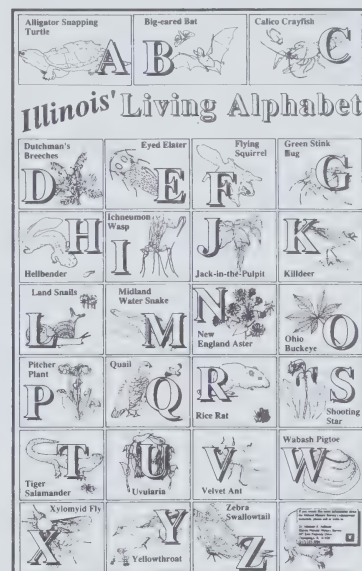
The hunt-and-find format is appealing to younger chil-



dren who may lack the motor skills to color the poster, but will enjoy finding and naming the animals.

Individual *Biodiversity* posters are available for 15 cents; classroom sets of 30 (with an answer key) may be purchased for \$3.50.

The coloring poster *Illinois' Living Alphabet* is 22" x 34" and comes with a teacher workbook describing each Illinois organism. Suggested activities that center around the poster are also included. Individual posters and the workbook are 50 cents; classroom sets of 30 are \$10.



Cartwright receives national award

The Geological Society of America presented an award for distinguished service in hydrogeology to Dr. Keros Cartwright, principal geologist and head of the Special Studies and Hydrogeology Research Laboratory at the Illinois State Geological Survey.

Given annually since 1984, the award honors Dr. George Burke Maxey, who served the field of hydrogeology more than 35 years and headed the Geological Survey's groundwater section from 1955 to 1961. Hydrogeology is that branch of geology concerned with the character, source, occurrence, movement, availability and use of water.

Cartwright, who holds an A.B. in geology from the University of California, Berkeley; an M.S. in geology from the University of Nevada, Reno; and a Ph.D. in geology from the University of Illinois, began his professional career in 1959 as a geologist on the Humboldt River Project in Nevada. He joined the Geological Survey in 1961, rising in 1984 to the senior posi-

tion of principal geologist and head of the General and Environmental Geology Group. He returned to full-time research at the Survey in 1988.

Cartwright was a visiting associate professor of geology at the University of Waterloo, Ontario, in 1976 and has served as adjunct professor of geology at Northern Illinois University, DeKalb, since 1979 and adjunct professor of geology at the University of Illinois, Champaign-Urbana, since 1985.

In addition, he is an active member and contributor to the leading geological and hydrogeological scientific societies. Cartwright is a fellow of the Geological Society of America and an active member of its Hydrogeology Division, having served as the division's Birdsall Distinguished Lecturer, secretary-treasurer, first and second vice chairman, and as chairman from 1977 to 1978. He is also a member of the American Geophysical Union, the National Water Well Associa-

The *INHS Poster Pack* contains six coloring posters, all 11" x 17", on trees of Illinois, Illinois forests, "making tracks," the family tree of insects, Illinois wildflowers and Illinois fishes. The set comes with a list of suggested study questions and answers, which are designed to pique interest in the depicted organisms. Individual poster packs are 25 cents; classroom sets of 30 are \$7. To obtain copies, send a check or money order to the Distribution Center, Illinois Natural History Survey, 607 East Peabody Drive, Champaign, IL 61820. mj

continued on page 12

Prestigious Leopold award presented to INHS' Sanderson

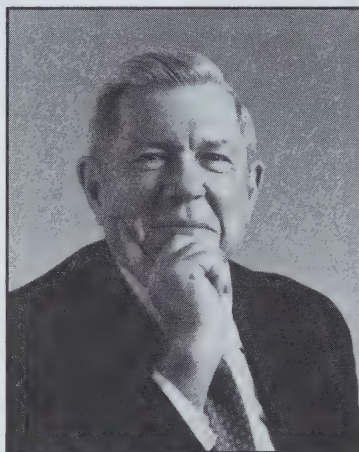
Dr. Glen Sanderson, a principal scientist emeritus with the Illinois Natural History Survey, a division of ENR, has received the Aldo Leopold Award from The Wildlife Society. The award is presented for distinguished service to wildlife conservation and is the highest honor bestowed by the national society of wildlife management professionals.

The award was presented at the 57th North American Wildlife and Natural Resources Conference in Charlotte, North Carolina. It is the ultimate recognition for a wildlife professional. Sanderson is a former head of the Center for Wildlife Ecology at the Survey and is a professor in the University of Illinois' Department of Ecology, Ethology and Evolution.

Sanderson has been called the "silent soldier" behind the accomplishments of the Survey's wildlife program. His primary area of scientific expertise is mammalogy. One of the world's leading authorities on the biology and ecology of the raccoon, Sanderson headed an important study on rabies in raccoons, skunks and foxes in the early 1960s. That study implicated skunks and probably raccoons as latent carriers of the disease. One of the leading furbearer biologists in the United States, Sanderson has been an official measurer of trophy wildlife for Boone and

Crockett, a national sportsman's organization, for many years.

Sanderson has also gained national and international prominence through his work on lead poisoning in waterfowl. He has been a driving force in the movement



Dr. Glen Sanderson

to eliminate lead shot and has been called "a giant in the crusade for steel shot." His 15 years of research in this area culminated in 1986 with a benchmark paper, *A Review of the Problems of Lead Poisoning in Wa-*

terfowl, coauthored by Dr. Frank Bellrose, a previous winner of the Aldo Leopold Award. The use of lead shot is now illegal for sport waterfowl hunting in the United States.

For nearly 30 years Sanderson has played the lead role in cooperative efforts to preserve two remnant flocks of critically endangered native Illinois prairie chickens. These efforts—conducted in conjunction with The Nature Conservancy and the Illinois Department of Conservation, as well as the Natural History Survey—have resulted in innovative approaches to land acquisition and management at the national level.

In addition to Sanderson's contributions to the science of wildlife biology, he has been a first-rate administrator, colleague and role model to his staff.

Sanderson's award places the Illinois Natural History Survey in the unique position of being the only institution in the nation that has had two staff members receive Aldo Leopold Awards. The Survey's first winner was Frank Bellrose, who received the honor in 1985. In addition, Dr. Thomas Scott, former head of wildlife research at the Survey, won the award in 1982 after he had left the Survey. □

Survey scientists earn environmental geology award

Illinois State Geological Survey scientist Richard C. Berg and Illinois State Water Survey scientists H. Allen Wehrmann and John M. Shafer are coauthors of a publication that received the national John C. Frye Memorial Award in Environmental Geology. The document, Circular 546 "Geological and hydrologic factors for siting hazardous or low-level radioactive waste disposal facilities," was published by the Geological Survey.

Presented annually at the national meeting of the Geological Society of America (GSA), this award was established by the Association of American State Geologists and the GSA to recognize Dr. Frye's substantial contributions to the understanding of environmental geology. Dr. Frye served as chief of the Geological

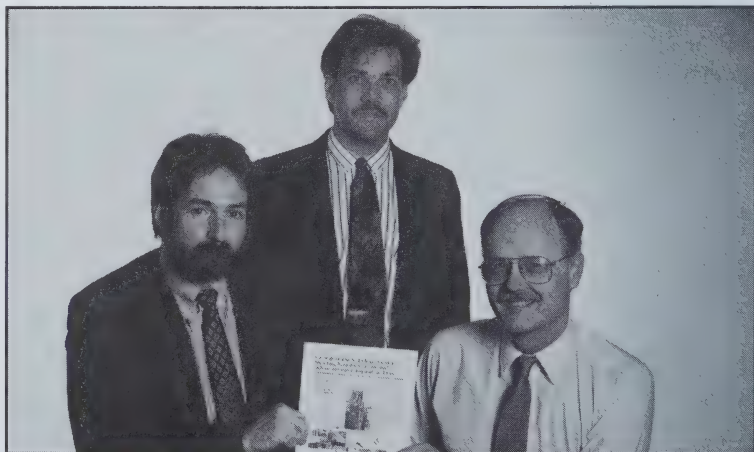


Photo by Joel Dexter, Illinois State Geological Survey

(l-r) Water Survey scientists John Shafer and Allen Wehrmann, and coauthor Richard Berg of the Geological Survey, show the publication that earned the national John C. Frye Memorial Award in Environmental Geology.

continued on page 12

Energy Alternatives

Alternative energy options make international news

News accounts continue to appear in the media touting alternative energy sources as viable options to traditional, nonrenewable fuels.

Hydrogen has received recent coverage as a potential solution to future energy crises. Hydrogen offers numerous advantages. It is the world's most abundant substance, burns without pollution and is compatible with conventional energy systems. Research is being conducted to enable automobiles to run on hydrogen and to allow power plants to generate electricity using hydrogen. Perhaps the biggest obstacle facing hydrogen fuel development is separating it from compounds,

such as water, since hydrogen does not naturally occur in pure form. However, proponents of this fuel, such as the National Hydrogen Association, are optimistic that technological advances will overcome such problems.

Wind power got a big boost recently when the government of Denmark committed its support for building additional windmills. Under the plan that was approved, wind energy will provide nearly 10 percent of Denmark's electricity requirements. Even before this expansion effort, Denmark had the most extensive wind power program in Europe. In fact, Danish research on how to harness wind energy for electrification purposes dates back to the 1890s.

Electric car development has also received media attention this spring. The International Auto Show held in Geneva, Switzerland, in March showcased efforts by European automakers to produce battery-powered cars that address problems such as car speed, mileage between recharging, and cost. Also, an emerging concern in Europe is the disposal of the hazardous chemicals used in car batteries. Peugeot expects to market electric cars by 1995. Volkswagen and Fiat are currently testing electric cars, but have no specific timelines for commercial sales. Electric car development is also proceeding in the United States. General Motors, Ford and Chrysler all have plans for demonstration fleets during this decade. **dk**

Hydroelectric project wins award for engineering achievement

On April 3, 1992, Stanley Consultants, Inc., received the Engineering Achievement Award for the Kankakee hydroelectric project. Stanley Consultants was the engineering firm hired by the city of Kankakee to design the project. The hydroelectric project was entered in the 1991-1992 Engineering Excellence Program, sponsored by the Consulting Engineer's Council of Iowa.

The \$4.8 million hydroelectric project was funded in part by the ENR Alternative Energy Bond Fund Program. ENR provided \$1.03 million toward the project. The 1.2-megawatt capacity plant is designed to produce 6.5 million kilowatt-hours annually.

The hydroelectric plant will provide approximately 60 percent of the power needed for the regional wastewater treatment facility. From October 1991 through January 1992, the hydroelectric facility was producing power above the design estimates.

ENR and the city of Kankakee are in the process of scheduling an open house for the hydroelectric facility. **Q**

ENR offers small power producer report

ENR recently published a report on the "Status of Small Power Producers and Interconnect Practices in Illinois." The Center for Neighborhood Technology developed the information through surveys and prepared the report.

The purpose of the project was to identify the existing small power producers in the state, determine the type of generator and fuel, determine the rated capacity, and estimate the annual kilowatt-hour production and costs. The study also looked at the possible barriers to the small power producers being interconnected with a utility.

The study identified 119 small power producers in Illinois interconnected to a utility. Surveys received from 73 of the sites indicated a capacity of 262 megawatts, with an annual output of 673 million kilowatt-hours. A secondary study is being planned that will develop recommendations for reducing the barriers to interconnection by small power producers.

Copies of the preliminary report are available through the ENR information clearinghouse, 325 West Adams Street, Room 300, Springfield, IL 62704-1892, 1-800-252-8955 (toll free in Illinois), or 217/785-0310 (out of state). **Q**

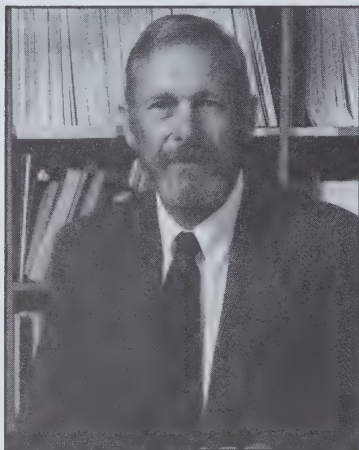
New energy projects selected for funding

The Steering Council of the Great Lakes Regional Biomass Energy Program has approved \$740,000 to fund 11 projects. Five of the projects are designed to promote the production and use of ethanol, including one that will receive up to \$300,000 to support the advanced development, testing and certification of heavy-duty ethanol engines for urban buses and over-the-road trucks. Other ethanol projects will support E-85 vehicle improvements, expand markets, lower production costs,

and evaluate the use of various ethanol blends.

In addition to the focus on ethanol, three wood combustion proposals were approved for funding, along with two technology transfer projects and a generic solicitation that will offer cost-shared funds for at least four proposals dealing with biomass energy. These 11 grant awards are expected to leverage more than \$1 million in non-U.S. Department of Energy funds. **dk**

Dr. Keros Cartwright *continued from page 9*



Dr. Keros Cartwright

tion, the International Association of Hydrogeologists, the American Water Resources Association, the American Institute of Hydrology, and the American Institute of Professional Geologists. He is also a fellow of the Explorer's Club. Cartwright has served as an officer for many societies, on the editorial board of several scientific journals, and on numerous technical committees in the furtherance of the earth sciences. In 1987, he was the National Water Well Association's Distinguished Lecturer of Groundwater Science.

Cartwright's principal areas of study are groundwater and related geologic characteristics of rocks. He has published about 115 scientific papers and reports. □

Do the Right Thing Illinois!

REDUCE
REUSE
RECYCLE



- Share a newspaper subscription
- Use reusable coffee cups
- Avoid products with excess packaging
- Bring your own sacks to the grocery store
- Buy items made from recycled paper or plastics
- Return plastic grocery sacks to the store for reuse
- Buy used goods, rather than new

Scientists win environmental geology award *continued from page 10*

Survey from 1954 to 1974 and, thereafter, as executive director of the GSA.

Publications considered for the award provide information on the basic geology or geologic process pertinent to an environmental problem or need and were published during the preceding three years by a state Geological Survey or the GSA. Approximately 35 papers were nominated for the award this year.

The award-winning report focused on the potential for contamination of water

resources by the disposal of hazardous and low-level radioactive wastes. Disposal sites require natural barriers to retard the migration of contaminants and must be stable, predictable and capable of being geologically and hydrologically characterized. This 61-page report presents a systematic approach to the selection and characterization of candidate sites. It covers review of existing data, construction of

regional and site maps, geologic and hydrologic field studies, and groundwater modeling.

The scientists detail data requirements and evaluation criteria consisting of regional screening to identify areas where it is highly probable that suitable sites may be located; area screening to collect geological and hydrological data to locate potential sites within favorable areas; and site characterization to map, test, monitor and model a candidate site. □

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Illinois Resources



Illinois Department of Energy and Natural Resources March/April 1992



Illinois needs you in the battle against solid waste

W e human beings are odd creatures. Oftentimes we deal with our problems by ignoring them, thinking they will miraculously disappear.

But of course problems never do truly disappear on their own. They languish until they eventually become too large to ignore and are no longer merely problems, but have evolved into critical situations.

Illinois residents face a dilemma that has become urgent. Like many large industrial states, Illinois is running out of room for its garbage. The typical Illinois household generates approximately 42 pounds of newspaper, 12 pounds of glass, 4 pounds of steel cans, 2 pounds of mixed plastics and 1 pound of aluminum cans each month. The number of Illinois landfills available to absorb the tons of waste material dumped into them annually becomes smaller every year. In 1981 Illinois had 550 landfills; only 66 are expected to remain operational by 1993.

Running out of landfill space does not mean that the state is running out of land, and some have suggested the "simple" solution of creating more landfills. This is not easily accomplished, however, since the nature of landfills makes them extremely difficult to site. A workable solution must minimize dependence on landfills.

Effective management of solid waste problems involves an integrated system that comprises four components: waste reduction, recycling, composting, incineration and landfilling. The Illinois Solid Waste Management Act of 1986 created a statewide program to establish policies for addressing the problems of solid waste in Illinois. ENR and the Environmental Protection Agency administer the program

through financial and technical assistance, education, environmental regulation and expansive recycling development.

At the forefront of efforts to deal with the disposal problem are recycling and waste reduction. The growth rate of recycling projects in Illinois is incredible. The state's first curbside recycling program, begun in 1987, serviced 125,000 households; nearly 1 million households are now involved in such programs.

ENR has led the effort to promote recycling as part of an overall strategy of solid waste management. ENR has developed programs to encourage materials recycling, market development for recycled materials, and energy recovery facilities. The department has provided technical assistance to local governments and businesses. Since 1987, ENR has awarded more than \$8 million in matching grants to communities and businesses for start-up or expansion of local recycling projects.

The increasing public support for transforming waste into new products is encouraging. Numerous Illinois communities have instituted curbside pickup for glass, aluminum, newspaper and plastic. Urban communities are interested in curbside programs because their convenience increases the likelihood of participation and the ability to divert significant volumes of materials from landfill disposal. Illinois has some of the most successful curbside recycling programs in the country. There are programs in the Chicago area with participation rates as high as 88 percent.

Although Illinois has experienced great success with residential recycling, we must move ahead quickly to increase the recycling of office paper and other types of recyclables from the commercial and corporate sectors. Programs such as the state's market development loan program can only further the economic development potential of industry to use

recyclables in the manufacture of new products.

Illinois state government not only promotes good solid waste management but also practices it. The office paper recycling program first instituted at the State of Illinois Center and the Illinois Department of Revenue has been expanded into the I-Cycle program, involving all state agencies. State procurement practices now require use of recycled and recyclable materials.

Recycling is a positive approach to dealing effectively with solid waste, a problem of increasing magnitude that must be addressed with innovation and commitment. Illinois residents are now realizing the serious effects solid waste management issues can have on the quality of life in our state.

April 22 is Earth Day. This observance offers wonderful opportunities to increase public awareness of the severity of solid waste problems and to stress the need to increase recycling efforts. Although we have come far, there is much more to be done in the battle against encroaching waste. There is a tremendous need to increase market development for paper and plastics, for example.

The benefits of recycling are well worth the effort. Illinois disposal costs range from \$10 to \$40 per ton. In comparison, costs in some East Coast states reach as high as \$140 per ton. Recycling programs offer viable methods to prevent such exorbitant fees. Recycling represents an opportunity for us to take an active role in gaining control over the problems caused by solid waste, while simultaneously protecting our environment and resources.

Remember—reduction, reuse and recycling benefits you, your neighborhood, your town, your state, and ultimately, the whole world. 25

Two European countries deal with waste disposal

Waste disposal is an international problem. It is complex and the technologies to deal with it are still being designed and built. Nevertheless, whether you have 30 years' experience, like Sweden, or just a few, like Italy, there can be no turning back. The three Rs—reduce, reuse and recycle—are here to stay, whether you say them in Italian, Swedish or English.

"Italy is a big, industrialized country," says Giacomo Macario. "We have approximately 500 people per square mile and generate 17 million tons of household waste each year."

Macario is president of Macario and Partners, s.r.l., a management consulting company in Milan, Italy. Over the last two years, Macario and his colleagues have developed a three-part approach to Italy's solid waste crisis. The first part focuses on redesigning production methods, the second on recycling, and the third on changing national attitudes.

Similar to the three Rs—reduce, reuse, and recycle—Macario says that "manufacturers must replan, re-invent and rebuild their products and procedures. Consumers must then reconvert, reuse and recover the goods they purchase. To accomplish the first two, there must be strong

individual and corporate conviction, open lines of communication, and development of

a new, environmentally attuned citizenry."

The first hurdle Italy must overcome in its solid waste battle is technological.

"Italian environmental companies are attentive to the evolution that is taking place in the international solid waste market and have started playing a part," says Macario. "Perhaps their involvement came somewhat later than others, but this gap is easily surmountable. Italy is a market that is investing its own technologies into the international market. It is essential to finance and increase research and development activities for innovative technologies. We must also increase our understanding of our environmental problems and how to solve them ourselves," Macario adds.

In fact, so attuned have Italians become to their household waste disposal problem that "large cities such as Milan use the weight of garbage collected daily to estimate the number of citizens who are away on holidays and long weekends," Macario says.

The total waste generated by Italian homes, hospitals, healthcare facilities, municipalities, and manufacturing industries is 200 million tons per year. Of this, the majority comes from zootechnical (domestication, breeding and improvement of animals) and agricultural wastes (100 million tons), followed by industrial and construction wastes (70 million tons), household wastes (17 million tons), and unspecified wastes (14 million tons).

Macario says that the types of waste discarded in Italian cities are similar to those found in most industrialized countries and contain large amounts of paper and plastics. In the southern, less populated parts of Italy, however, 40 percent of

household waste is made up of "perishable organics," followed by cellulose, plastics, inerts and metals.

Twenty years ago, landfills were the chief method of waste disposal in Italy, simply because residents were opposed to incinerators "with their huge smoke stacks that were visible over great distances.

"Today, new incinerator and smoke-filtering technologies and correct management have shown that emission restriction levels can be met and surpassed," Macario says.

"We also realize that burying waste is far more damaging to the environment than properly burning it," he says. However, Macario adds that the technical, logistical and economic problems of waste disposal have become so acute for communities that recycling appears to be a real alternative, one that needs the involvement of both the government and the private sector.

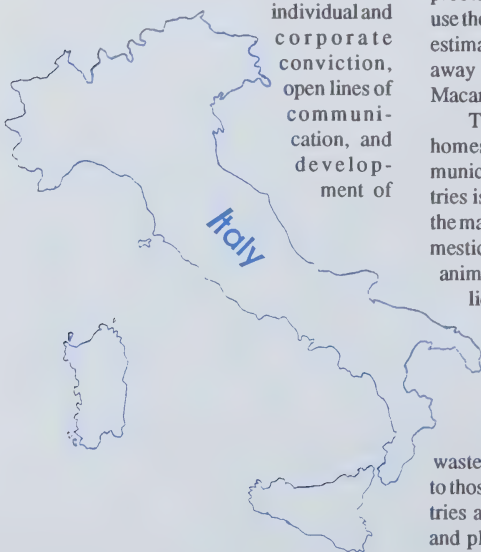
Laws were passed in 1982 to regulate recycling and the monitoring of waste disposal. Plastics were targeted first, with a goal of recycling 40 percent by 1992. Italy is also developing a coding technique similar to the one now used in Illinois to differentiate various types of plastics.

Currently, household waste is picked up twice a week in most Italian towns and is placed in either plastic bags that are purchased from or provided by town councils, or in large metal containers. Large, bulky items are separated from regular waste and taken "directly to the town's waste-gathering and disposal center."

Since 1988, additional legislation restricted the types of items that can go into the waste stream. For example, batteries, expired medicines, and glass are no longer accepted and an aluminum can recovery program is getting under way.

Another significant piece of legislation that covers a variety of solid waste issues was passed in June 1991. Among other things, it establishes a 10-year timeline during which 26 recycling plants must be built and selective collection must be established to provide separation before collection. Each region in Italy will develop its own plan of action and local officials will have the authority to decide how to

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Museums, park and conservation districts awarded revenues

ENR has announced grants totaling \$1,041,141 to 17 Illinois museums, aquariums, park districts and conservation districts. The grants for general operating support and capital improvements are distributed from the Horse Racing Tax Allocation Fund.

First-time grant recipients are the Vermilion County Conservation District and the Grayville, Waukegan, Joliet and Fox Valley park districts. In addition, the Rockford, Peoria and Springfield park districts received grants for museum purposes. If a park district does not maintain a museum, the grant may be used for general purposes. In Chicago, the grants are distributed to museums and aquariums.

The grant program was authorized by the Horse Racing Act of 1987, which required that four-sevenths of one percent of the tax revenue on receipts collected from intertrack wagering locations be allocated to ENR for the purpose of making these grants. ENR distributes the proceeds semi-annually in February and August. □

Grant Recipients

| | |
|--|--------------|
| Vermilion County Conservation District | \$ 93,392.00 |
| Peoria Park District | 63,082.86 |
| Grayville Park District | 25,160.00 |
| Waukegan Park District | 137,716.57 |
| Joliet Park District | 76,018.29 |
| Rockford Park District | 71,366.86 |
| Springfield Park District | 38,645.71 |
| Fox Valley Park District | 92,656.00 |
| Art Institute of Chicago | 99,789.42 |
| Field Museum of Natural History | 99,789.42 |
| Museum of Science and Industry | 99,789.42 |
| John G. Shedd Aquarium | 71,569.53 |
| Adler Planetarium | 31,785.54 |
| Chicago Historical Society | 16,494.50 |
| Chicago Academy of Science | 15,687.61 |
| DuSable Museum of African American History | 4,431.03 |
| Mexican Fine Arts Center Museum | 3,766.37 |

Chicago to host international conference on global warming

The third annual International Conference on the Scientific and Policy Issues Facing All Governments will be held April 6-9, 1992, at the Westin Hotel O'Hare in Chicago.

The objective of "Global Warming—A Call for International Coordination" is to provide an international forum on scientific and policy issues facing governments with regard to the greenhouse effect and similar transnational environmental problems, including regional extreme climatic swings, water shortages, floods and acid rain.

For more information, contact Dr. Sinyan Shen, Natural Resource Management Division, SUPCON International, One Heritage Plaza, Woodridge, IL 60517-0275, (708) 910-1551 or (419) 372-8207. □

Pollution prevention nominees sought

With increasing public concern over toxic and hazardous substances being released into the environment, many Illinois industries, businesses, education and civic organizations are developing innovative ways to reduce or eliminate generation of toxic and hazardous wastes.

Through the sixth annual Governor's Pollution Prevention Awards, sponsored by the Illinois Department of Energy and Natural Resources, the state of Illinois will acknowledge the invaluable contributions of those organizations that have implemented pollution prevention strategies.

Governor Jim Edgar presented last year's pollution prevention awards to 27 industries and organizations.

"The winners of these awards have exhibited a commitment to protect our environment," Edgar said. "They have made an investment in our future that will pay dividends in a variety of ways."

The awards are presented to Illinois generators of waste that have significantly reduced the amount of hazardous and solid waste they produce. Many achieve this by adopting new pollution prevention tech-

nologies, techniques or management strategies.

ENR conducts judging through the Hazardous Waste Research and Information Center (HWRIC), in collaboration with the Illinois Environmental Protection Agency and the Governor's Office.

To be considered for this year's awards, HWRIC must receive an application form with a detailed description of the organization's pollution prevention program by May 30, 1992. For information or to request an application, contact Betsy Mitchell or Laura Hause at HWRIC in Champaign, (217) 333-8940.

The award winners set an important example for waste reduction that businesses and others throughout the state can follow. Former award winners include: Sun Chemical Corporation; Advanced Filtration Systems, Inc.; Caterpillar, Inc.; Chemical Industry Council of Illinois; Nalco Chemical Company; Northwestern University; BASF Corporation; Ite! Rail Corporation; Motorola, Inc.; Wildfire Prairie Park; Automotive Wholesalers of Illinois; and Illinois Benedictine College. □

Illinois clean coal technology funding tops \$1 billion

A long-term commitment to environmentally acceptable energy usage has led Illinois to surpass \$1 billion in funding for clean coal technology (CCT) projects.

More than \$1.1 billion has been spent or is earmarked for spending by 1995 on CCT projects in Illinois through expenditures by the federal government (principally the U.S. Department of Energy), the state of Illinois and private sources. Since the 1970s, Illinois has maintained its leadership role in the research, testing and demonstration of CCT projects. This effort has resulted in the demonstration of new technologies to promote economically efficient and environmentally sound use of Illinois coal.

Since 1978, the ENR Clean Coal Demonstration Program has provided funding for 20 CCT demonstration projects. Illinois' commitment of \$191.6 million has attracted \$193.4 million in federal funds and \$717.7 million in private and public cost-sharing, or nearly five times the state's funding.

Each project eligible for funding must meet five criteria:

- solid, liquid and gaseous emissions from the system will meet all existing federal and state environmental regula-

tions;

- the project will use high-sulfur Illinois coal as its primary feedstock;
- the project involves the use of innovative technology, the majority of which are demonstrations at commercial scale;
- the project offers significant economic benefits to Illinois; and
- the project is located in Illinois.

"Crossing the billion dollar threshold for clean coal technology funding constitutes a landmark achievement for Illinois," said ENR Director John S. Moore. "This level of commitment indicates how seriously Illinois has taken its efforts to find ways to burn high-sulfur coal and use its high heating value, while still protecting the environment."

As many targeted utilities switch to low-sulfur Western coal rather than scrub Illinois high-sulfur coal to comply with the 1990 Clean Air Act amendments, ENR estimates there will be a decline in Illinois coal production. This lost production of nearly 25 percent by 1995, from 60 million tons to less than 46 million, as well as the loss of between 3,000 and 4,000 mining jobs, will significantly impact the Illinois economy. In Illinois, where the coal industry is estimated to add \$1.5 billion annually

to the state's economy, hundreds of millions of dollars of revenue could be lost.

That makes CCT work all the more significant to the state. Projections indicate that by 1995, more than 7.8 million tons, or 17 percent, of Illinois' total coal production will be sustained annually as a result of Illinois' commitment to CCTs in the ENR program.

Employment projections for 1995, according to Regional Economic Model, Inc., show that more than 1,400 mining jobs and 5,400 nonmining jobs will be supported by ongoing coal sales related to CCT development. These jobs will preserve roughly \$290 million in personal income annually to the state's economy.

Beginning in 1995, Clean Air Act emission control mandates of Phase I will take effect. Power plants throughout the country faced with crucial decisions on how to continue meeting electricity demands are targeted. Phase II mandates, which will take effect in 2000, will bring even stricter controls on emission pollutants of sulfur dioxide and nitrogen oxide. Several hundred additional power plants across the country, representing the majority of the nation's output capacity, will be affected by Phase II requirements.

Examples of CCTs that are either currently being readied for testing and demonstration, have been tested and demonstrated, or are already commercially operated in Illinois include:

- ▲Construction is scheduled to begin in January 1993 at the Illinois Coal Development Park on an \$18 million mild coal gasification demonstration project. The facility will convert 24 tons of coal each day into a clean-burning solid fuel, liquid by-products used to make plastics, gasoline and fuel gas to fire the demonstration plant itself. Sulfur compounds will be recovered from a variety of coal fuels. The process uses lower temperatures and pressures than current gasification methods.

- ▲Coal gasification combined cycle power generation will be tested at the City Water, Light & Power Springfield station. With this technology, coal is converted to gas through the use of a gasifier. The gas



Governors State University photo

A silver gelatin print by Brett Weston titled "Japan" is featured in the Positive/Negative exhibition at the Illinois State Museum's Lockport Gallery in Lockport, Illinois. The exhibition, appearing at the Gallery from April 12 through May 22, highlights photographs from the permanent collection of Governors State University. "Photo Profiles," a series of 30-minute videos that examine the lives of several of the photographers whose works appear in Positive/Negative, will accompany the exhibition. Call the Lockport Gallery for information, (815) 838-7400.

continued on page 5

Galena field trip rounds out season for Geological Survey

Every year, four free all-day field trips are led by David L. Reinertsen, head of the Educational Extension at the Illinois State Geological Survey, to acquaint participants with the geology, landscape and mineral resources of specific areas of Illinois. The Survey will wrap up its spring field trip season with an excursion to the Galena area of Jo Daviess County on May 16.

The group will tour the rugged hills known as the Driftless Area—never covered by glaciers and glacial drift—that make up the picturesque region of northwestern Illinois and southwestern Wisconsin.

Fragments of ancient erosional surfaces, called peneplains, reveal the region's geomorphic history. Bedrock was deposited between about 500 million and 400 million years ago during the Ordovician and Silurian Periods of geologic time. The Silurian and underlying Ordovician bedrock layers are well exposed in the area. Marine fossils, abundant in these rocks, include *Receptaculites*, the so-called "sunflower coral," and the famous "depauperate fauna" of the Ordovician Maquoketa shale.

At several stops, Reinertsen will discuss topography, the Silurian escarpment and the Mississippi River gorge. Terrace

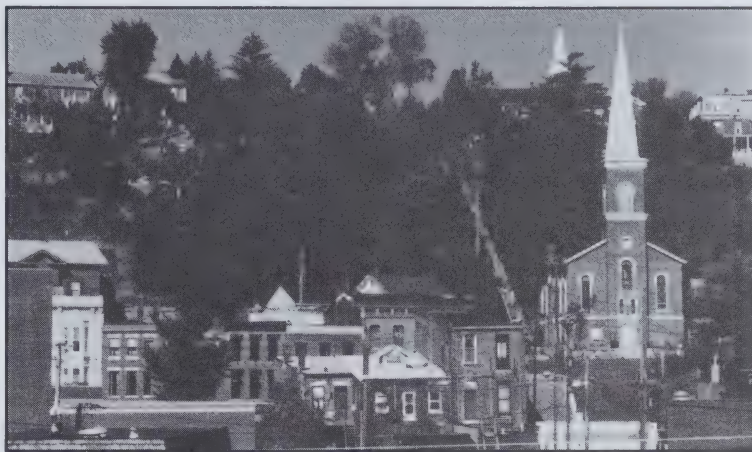


Photo by Joel Dexter, Illinois State Geological Survey

The homes and businesses in the city of Galena were built among the imposing hills formed in the Driftless Area of northwestern Illinois and southwestern Wisconsin, as seen in this photo of the downtown Galena area.

sediments in the valleys and loess deposits across the uplands were produced by Wisconsin glaciations.

During the mid-1800s, the Galena area was the heart of the Upper Mississippi Valley lead mining district and the world's top producer of lead. On this trip, participants will visit some abandoned mines.

The caravan will depart from Galena High School, 1206 North Franklin Street,

in the northwest part of town, just southeast of U.S. 20 and State Route 84. Assemble at the high school before 8:15 a.m. for registration (there is no preregistration). The trip will begin immediately following registration and will continue until approximately 4 p.m.

Because the excursion includes sites located on private property, each partici-

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Clean coal grants *continued from page 4*

is then cleaned and burned in a combined cycle power generation system that uses gas turbines to burn the clean fuel gas, while exhaust heat is recovered to power a steam turbine. Commercial results, according to the U.S. Department of Energy, could translate into more than a 99 percent decrease in sulfur dioxide emissions, while also eliminating 95 percent of nitrogen oxide. Construction of the integrated plant is scheduled to start in 1994.

▲Gas reburning/sorbent injection technology is being tested at the Illinois Power Company's Hennepin station and the City Water, Light & Power Springfield station. This process involves the use of natural gas above a boiler's main heat release zone to convert nitrogen oxides to nitrogen, and injection of hydrated lime to remove sulfur

dioxide during combustion. With 20 percent heat input from gas, results to date from the Hennepin station show that nitrogen oxide emissions have been cut by up to 77 percent and sulfur dioxide emissions by up to 62 percent. Testing at the Springfield site is scheduled to begin in April 1992.

▲At the Archer Daniels Midland (ADM) Company in Decatur, a fluidized bed combustion technology captures more than 90 percent of sulfur dioxide emissions. At its Decatur plant, ADM's fluidized bed boilers burn between 1 million and 1.25 million tons of high-sulfur coal each year, according to plant supervisor Kendall Reed.

▲A flue gas desulfurization system known as the Chiyoda Thoroughbred (CT-121) scrubber treats emissions from

the combustion of more than 100,000 tons of high-sulfur Illinois coal each year at the Abbott plant, located at the University of Illinois in Champaign-Urbana. The CT-121 system has a sulfur dioxide removal efficiency of more than 90 percent. Since 1988 the project has saved the university more than \$3 million by using coal instead of natural gas for heating and cooling.

Developing these and other advanced clean coal technologies in Illinois will help to ensure the future of the state's vital coal industry, while reducing air pollutants from power plant emissions to levels well below new federal standards. With an abundance of coal resources and the ability to burn those resources cleanly and efficiently, Illinois can indeed energize the world into the 21st century. □

Hazardous Waste Research and Information Center offers valuable information on chemical hazards in the home

Many people think of "hazardous wastes" as chemicals discarded by industries, businesses and hospitals. The truth is, hazardous wastes can also be found in your house, garage, workshop and garbage can.



Many common household products contain the same chemicals that constitute industrial hazardous wastes. Americans routinely keep aerosols, bleach, detergent cleaners, medicines, drain cleaners, pet sprays and shampoos, furniture stripper, waxes, disinfectants and batteries within easy reach on the shelves. Used motor oil and leftover paint thinner, oven cleaner, lawn care products, polish and insect sprays can be scrounged up in almost every household.

The chemicals in these "everyday" products are potentially harmful to humans, animals and the environment. Most people are aware of proper use restrictions, but sometimes they don't think about the need for proper storage and disposal.

Hazardous materials can come in gaseous, liquid, solid or semisolid form. The degree of hazardous threat posed by a substance is determined by measuring its specific chemical characteristics. A substance is classified as hazardous if

it exceeds a specific limit for one or more of these characteristics:

✓How easily it catches fire (gasoline). These substances are classified as **ignitable**—having a flash point of less than 140°F.

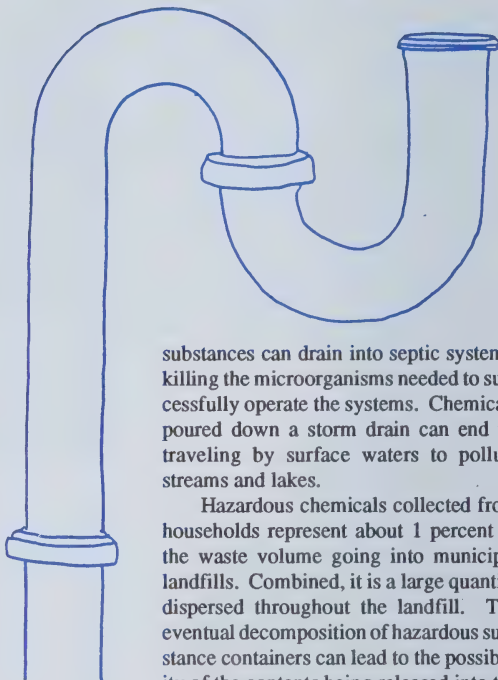
✓How acidic or caustic it is (oven cleaner). These are classified as **corrosive**—having a pH less than 2 or greater than 12.5.

✓The toxic levels of long- and short-term exposures to humans and animals from chemicals that easily leach (pesticides, antifreeze, waste motor oil and paint strippers). These are classified as **toxic**—sufficient quantities may pose a substantial threat to health or the environment.

✓How explosive or reactive it is with water, heat or pressure (aerosol cans), classified as **reactive**—explosives, unstable compounds, and compounds that react with water.

Improper use and storage of household chemicals may pose safety hazards: Some containers stored for long periods of time can deteriorate. Chemicals leaking from damaged containers create fire hazards and can sometimes cause eye and respiratory problems. Some chemicals can cause explosions if mixed together. Many household chemicals can poison children and animals if consumed.

Improper disposal can create environmental hazards. Household chemicals poured down the drain, thrown in the trash or dumped onto the ground can contaminate water supplies both above and below ground. Hazardous



substances can drain into septic systems, killing the microorganisms needed to successfully operate the systems. Chemicals poured down a storm drain can end up traveling by surface waters to pollute streams and lakes.

Hazardous chemicals collected from households represent about 1 percent of the waste volume going into municipal landfills. Combined, it is a large quantity dispersed throughout the landfill. The eventual decomposition of hazardous substance containers can lead to the possibility of the contents being released into the soil and groundwater, contaminating the entire area.

Consumers are encouraged to buy only needed products in quantities that can be used up in a reasonable amount of time and to use alternatives or substitutes for hazardous household chemicals.

Households are "unregulated" generators of very small quantities of hazardous wastes. The ENR Hazardous Waste Research and Information Center (HWRIC) offers information and assistance to households and other generators of hazardous waste.

For more information on any aspect of hazardous materials and waste, contact HWRIC at One East Hazelwood Drive, Champaign, IL 61820, (217) 333-8940. ■



Chemical Hazards in the Home

| Product | Possible Hazards | Disposal Suggestions | Precautions and Substitutes |
|---|---|--|--|
| Aerosols | When sprayed, contents are broken into particles small enough to be inhaled Cans may explode or burn. | Put only empty cans in trash. Do not burn. Do not place in trash compactor | Store in cool place Propellant may be flammable Instead: use non-aerosol products |
| Batteries: mercury button type | Swallowing one may be fatal if it leaks. <i>Toxicity 5*</i> | Throw in trash. | No substitutes |
| Bleach: chlorine | Fumes irritate eyes. Corrosive to eyes & skin. Poisonous if swallowed. <i>Toxicity 3*</i> | Use up according to label instructions or give away. | NEVER MIX WITH AMMONIA! Instead: use Borax, non-chlorine bleach, sunlight, lemon juice. |
| Detergent cleaners | All are corrosive to some degree. Eye irritant. <i>Toxicity 2-4*</i> | Use up according to label instructions or give away. May be diluted & washed down sink. | Liquid dishwashing detergent is mildest, laundry detergent is moderate, automatic dishwasher detergent is harshest Instead: use the mildest product suitable for your needs. |
| Disinfectants | Eye & skin irritant. Fumes irritating. Poisonous if swallowed. <i>Toxicity 3-4*</i> | Use up according to label instructions or dilute & pour down sink. | Some may contain bleach, others ammonia — DO NOT MIX! Instead: use detergent cleaners whenever possible |
| Drain cleaners | Very corrosive. May be fatal if swallowed. Contact with eyes can cause blindness | Use up according to label instructions or give away. | Prevention best: keep sink strainers in good condition Instead: use plunger, plumber's snake, vinegar & baking soda followed by boiling water. |
| Flea powders, sprays & shampoos | Moderately to very poisonous <i>Toxicity 2-4*</i> | Use up or save for hazardous waste collection day. | DO NOT USE DOG PRODUCTS ON CATS. Vacuum house regularly & thoroughly Launder pet bedding frequently |
| Insect and pest sprays | All are poisonous, some extremely so. May cause damage to kidneys, liver, or central nervous system. Toxicity varies from product to product. | Use up very carefully & according to label instructions. Save for hazardous waste collection day | Instead: do not attract insects: keep all food securely covered, practice good sanitation in kitchen & bathrooms, remove trash every night |
| Medicines: unneeded or expired | Frequently cause child poisonings | Flush down sink or toilet | Check content of medicine chest regularly. Old medications may lose their effectiveness, but not necessarily their toxicity. No substitutes |
| Metal polishes | May be flammable. Mildly to very poisonous <i>Toxicity 2-4*</i> | Use up according to label instructions or give away | Use only in well-ventilated area Instead: substitute vinegar & salt or use baking soda on damp sponge |
| Mothballs | Some are flammable Eye & skin irritant, poisonous, may cause anemia in some individuals | Use up according to label instructions or give away | Do not use in living areas Air out clothing and other items before use Clean items before storage Instead: use cedar shavings or aromatic herbs |
| Oven cleaner | Corrosive Very harmful if swallowed Irritating vapors. Can damage eyes. <i>Toxicity 2-4*</i> | Use up according to label instructions or give away. Save for hazardous waste collection day | Do not use aerosols, which can explode and are difficult to control Instead: use paste. Or heat oven to 200 degrees, turn off, leave small dish of ammonia in oven overnight and remove, then wipe oven with damp cloth and baking soda. Do not put baking soda on heating elements. |
| Toilet bowl cleaner | Corrosive. May be fatal if swallowed. <i>Toxicity 3-4*</i> | Use up according to label instructions or wash down the sink or toilet with lots of water | Ventilate room Instead: use ordinary cleanser or detergent and baking soda |
| Window cleaner | Vapor may be irritating Slightly poisonous <i>Toxicity 2*</i> | Use up according to label instructions or give away | Ventilate room. Instead: spray on vinegar, then wipe dry with newspaper |
| Wood cleaners, polishes, & waxes | Fumes irritating to eyes Product harmful if swallowed Eye & skin irritant. Petroleum types are flammable | Use up according to label instructions or save for hazardous waste collection day. | Do not use aerosols Use only in well-ventilated areas Instead: use lemon oil or beeswax |

*General Toxicity Rating

Format courtesy of Citizens For A Better Environment

| | 1 | 2 | 3 | 4 | 5 | 6 |
|-------------------------------|-------------------|-------------------|-------------------|-----------------------|-----------------------|-------------------|
| | Almost Non-Toxic | Slightly Toxic | Moderately Toxic | Very Toxic | Extremely Toxic | Super Toxic |
| Lethal Dose for 150 lb. Adult | More than 1 Quart | 1 Pint to 1 Quart | 1 Ounce to 1 Pint | 1 Teaspoon to 1 Ounce | 7 Drops to 1 Teaspoon | Less than 7 Drops |

From Gosselein et al., 1984

For more information: Hazardous Waste Research and Information Center (217) 333-8940

Illinois Poison Control Center 1-800-252-2022

Illinois Animal Poison Information Center (217) 333-3611

—OVER—

 Produced by the
Hazardous Waste
Research and
Information Center

ENR
Illinois Department of
Energy and Natural Resources

Chemical Hazards in the Garage and Home Workshop

| Product | Possible Hazards | Disposal Suggestions | Precautions and Substitutes |
|---|---|---|---|
| Aerosols | When sprayed, contents are broken into particles small enough to be inhaled. Cans may explode or burn. | Put only empty cans in trash. Do not burn. Do not place in trash compactor. | Store in cool place. Propellant may be flammable. Instead: use non-aerosol products |
| Asphalt roofing compound | Eye irritant. Fumes moderately toxic. <i>Toxicity 3*</i> | Use up according to label instructions or give away. | Do not use indoors. No substitutes. |
| Auto: antifreeze | Very poisonous. Has sweet taste — attractive to small children & pets. <i>Toxicity 3-4*</i> | Amounts of less than 1 gallon pour down sink with plenty of water. Do not do this if you have a septic tank. Put in a secure container & take to a garage or service station. | Clean up any leaks or spills carefully. No substitutes. |
| Auto: batteries | Contain strong acid. Very corrosive. Danger to eyes & skin. | Recycle. | Trade in old batteries. No substitutes. |
| Auto: degreasers | Corrosive. Poisonous. Eye & skin irritant. <i>Toxicity 2-4*</i> | Use up according to label instructions or give away. | Instead: choose strong detergent type over solvent type |
| Auto: motor oil & transmission fluid | Poisonous. May be contaminated with lead and other toxic substances. Skin & eye irritant. | Recycle. | No substitutes. |
| Auto: waxes & polishes | Fumes irritating to eyes. Harmful if swallowed. Eye & skin irritant. | Use up according to label instructions or give away. | Use outside. No substitutes. |
| Lacquer & lacquer thinner | Extremely flammable. Very poisonous. <i>Toxicity 4*</i> | Use up according to label instructions or save for hazardous waste collection day. | Ventilate area very well. Do not use in room with pilot light, open flame, electric motors, spark-generating equipment, etc. DO NOT SMOKE WHILE USING No substitutes |
| Paint strippers, thinners, & other solvents | Many are flammable. Eye & skin irritant. Moderately to very poisonous. <i>Toxicity 3-4*</i> | Let settle, pour off cleaner for re-use. Pour sludge into container & seal, or wrap well in newspaper & throw in trash. Use up according to label instructions or save for hazardous waste collection day. | Avoid aerosols Buy only as much as you need. Ventilate area well. Do not use near open flame. Instead of paint stripper: sand or use heat gun. Use water-based clean-up products as much as possible |
| Paints (oil-based) & varnishes | Flammable. Eye & skin irritant. Use in small, closed area may cause unconsciousness. | Use up according to label instructions or save for hazardous waste collection day. | Ventilate area well. Do not use near open flame. May take weeks for fumes to go away Instead: use water-based paints if possible |
| Insecticides,* herbicides, fungicides, slugbait, rodent poison, wood preservatives | All are dangerous to some degree. Can cause central nervous system damage, kidney & liver damage, birth defects, internal bleeding, eye injury. Some are readily absorbed through the skin. <i>Toxicity 3-6*</i> | Use up carefully, following label instructions. Save for hazardous waste collection day. | Do not buy more than you need. Instead: try hand-picking, mechanical cultivation, natural predators. Practice good sanitation. Choose hardy varieties. Use insect lures & traps. As a last resort, use least toxic suitable pesticides. |

** The following pesticides were previously sold for use by homeowners and the general public but have since been banned or are no longer recommended for use by homeowners.

Calcium Arsenate, Copper Arsenate, Arsenate, Creosote, Pentachlorophenol (PCP), Chlordane, DDT, Silvex, 2-4-D T, Sodium Arsenite, Heptachlor, Aldrin, Dieldrin.

These pesticides should be carefully stored and saved for a hazardous waste collection day. Here is one way to safely store them. Get a plastic container with a lid (a 5-gallon plastic bucket, for example). Fill halfway with kitty litter. Keep the substance **IN ITS ORIGINAL BOTTLE OR BOX** and put it in the plastic container. Fill to the top with kitty litter and replace the lid. Mark the container clearly and store it away from children, pets, etc. It is a good idea to store the container on a shelf rather than a concrete or soil floor to reduce corrosion.

Format courtesy of Citizens for a Better Environment

*General Toxicity Rating

| | 1 | 2 | 3 | 4 | 5 | 6 |
|-------------------------------|-------------------|-------------------|-------------------|-----------------------|-----------------------|-------------------|
| | Almost Non-Toxic | Slightly Toxic | Moderately Toxic | Very Toxic | Extremely Toxic | Super Toxic |
| Lethal Dose for 150 lb. Adult | More than 1 Quart | 1 Pint to 1 Quart | 1 Ounce to 1 Pint | 1 Teaspoon to 1 Ounce | 7 Drops to 1 Teaspoon | Less Than 7 Drops |

From Gossehn et al., 1984



Resource Bookshelf

Plastics in Perspective, ILENR/RR-91/18. Free.

Many of the most troubling aspects of the solid waste problems facing our society center around plastics, a nonrenewable resource developed from petroleum that does not readily recycle through the natural ecosystem. The information presented in this curriculum supplement, developed for use with students in middle or high school science classes, provides an in-depth picture of the plastic waste dilemma facing us all. The curriculum is intended to help students become better informed citizens and decision makers, prepared to improve upon their predecessors' record of resource use.

Final Report of the Degradable Plastics Task Force, ILENR/RR-91/03. Free.

The state of Illinois is actively involved in preserving the state's natural resources and protecting the health of Illinois residents by planning for the most environmentally acceptable solid waste management procedures possible. There are two perspectives on the impact of degradable plastics in solid waste management. Some believe that degradable plastics can be a component of the solution to the solid waste problem. Others believe that degradables may add to the problem. Both the Illinois Degradable Plastics Act (P.A. 86-775) and the Illinois Agricultural Commodity-Based Plastics Development Act (P.A. 86-778) call for the state to actively promote degradable plastics in various ways. P.A. 86-776 created the Advisory Task Force on Degradable Plastics to evaluate the many issues pertaining to the use and disposal of degradable plastics and to reach a consensus on the feasibility and consequences of requiring consumer products to be degradable. The task force identified issues concerning degradable plastics, including the current status of technologies, the environmental fate of degradable plastics, their role in solid waste management, and their impact on the consumer. This report discusses these issues and presents the findings and recommendations of the task force.

Landscaping Techniques and Materials for Urban Illinois Stream Corridors and Wetland Edges, ILENR/RE-WR-91/12. Free.

Special challenges exist in preserving and restoring natural riparian corridors and streams within an urban context. While there is increasing interest and acceptance of preserving and restoring the natural landscape in urban settings, there also is a general lack of awareness of innovative work along these lines in both the public and private sectors. This research addresses this knowledge gap. The project provides an extensive, but not exhaustive, catalog and survey of work done in Europe and the United States. This report should serve as a guide to basic information for those who wish to pursue further investigation.

On-Road Carbon Monoxide and Hydrocarbon Remote Sensing in the Chicago Area, ILENR/RE-AQ-91/14. Free.

Urban air quality does not meet the federal standards in many American cities. Violations of the ozone standard arise from photochemical transformation of oxides of nitrogen (NO_x) and hydrocarbons (HC). Carbon monoxide (CO) standards are primarily violated as a result of direct emission of the gas. Although there are differences between compounds and between different urban areas, mobile sources are a major factor in all urban emissions inventories for carbon monoxide, hydrocarbons, and oxides of nitrogen. The University of Denver remote sensor for motor vehicle CO and HC emissions was used for seven days in the Chicago area in October 1990. The system also recorded vehicle speed, an estimate of acceleration and a freeze-frame video picture of the rear of the vehicle from which the license plate was read. Results imply that an inspection and maintenance program incorporating remote sensing has the potential to identify a significant fraction of the on-road CO and HC emissions while inconveniencing only a small fraction of all vehicle owners. This study is a follow-up to the 1989 study of CO emissions only; the addition of hydrocarbon data adds a new dimension scientifically, although the essential conclusions remain the same.

tdf, Report on Test Burning of Tire-Derived Fuel in Solid Fuel Combustors, ILENR/RR-91/16. Free.

Scrap tire disposal is a growing problem in Illinois and throughout the United States, and has led to a variety of health and environmental concerns. This study was commissioned to determine the overall viability of using scrap tire chips, known as tire-derived fuel (TDF), as a supplemental fuel in conventional coal-fired boilers. The study involved actual tests at Monsanto Company's W. G. Krummrich Plant in Sauget, Illinois, as well as general extrapolations on the feasibility of using TDF at other sites. This report shows that TDF can be an excellent supplemental fuel supply, providing a cost-effective fuel source while helping to alleviate the dilemma of scrap tire disposal.

These publications are available through
the ENR information clearinghouse,
1-800-252-8955 (in Illinois),
217/785-0310 (out of state), or the
National Technical Information Service in
Springfield, Virginia, 703/487-4650.

International waste disposal *continued from page 2*

manage and distribute the work and where the selective collection will take place. Meanwhile, regions in several parts of Italy have begun their own innovative waste reduction programs and projects.

One of the country's largest compost installations started up in the Alto-Adige region in September 1991. It turns the organic waste produced by 250,000 people into a soft humus.

"The novelty of this project is that steps have finally been taken to stop wasting this potential resource, which can be turned into a good fertilizer," says Macario.

In Rimini, in the Romagna region, organic wastes are also collected from 150 hotels and restaurants. This refuse is then mixed with decanted purification sludges and sawdust and turned into compost.

In the region of Emilia, a "manure bank" has been established at an experimental plant near Modena, where liquid dung will be turned into manure.

This process will help solve one of the major problems plaguing farmers and the environment alike: the disposal of wastes and the pollution of the Po River and the Adriatic Sea."

Macario admits that Italy is just beginning to deal with its solid waste problems, but as technologies are developed and laws passed to give direction to the solid waste program, Italy will join the growing number of countries that have recognized and are actively dealing with this international problem.

Tibor Kertesz is managing director of the Sanitation Department in Gothenburg, Sweden, and oversees the waste division, the industrial waste division, and the municipal workshops. His department also operates a landfill site where demolition and construction waste are sorted, recovered and landfilled.

"We live in a society that is not in ecological balance," says Kertesz. "Sooner or later everything handled by society becomes waste. Many people in the Scandinavian countries put environmental protection before economic growth."

Sweden is a country of 8.5 million people, 3 million fewer than the state of Illinois. Its largest city is Stockholm, with

672,000 residents, followed by Kertesz's home, Gothenburg, with 432,000 people.

"We began developing a solid waste program for our cities in the '60s," says Kertesz, "and have reduced domestic and industrial wastes considerably."

The main methods of waste disposal in Sweden today are incineration (60 percent), landfilling (35 percent) and composting (25 percent). Because Sweden has been able to develop technologies that reduce toxic emissions caused by the burning of waste, incineration has become the country's number one solid waste alternative. Currently,



15 percent of Sweden's homes are heated by the energy generated through an incineration waste-to-energy recovery program.

"By the year 2000, that number will double when industrial waste is added to the incinerators," says Kertesz.

Household waste collection is handled by public and private haulers, with 53 percent collected by municipalities and 47 percent by private collectors. Handling costs are covered by a special fee (similar to an electric bill) and run about \$155 a year. Apartment dwellers pay \$50 a year. There is no curbside pickup, everything is left in the backyard.

"In Sweden, the production of domestic and industrial waste has been approximately the same for almost 15 years. This is due to increased recycling of household waste and increased concern by industry about recycling and low-waste technology."

Currently, 80 percent to 85 percent of all aluminum cans and 97 percent of all returnable glass bottles are recycled. Out of an annual total of 46 million tons of industrial waste, 20.5 million tons are now recycled, recovered or brought to municipalities for final treatment or disposal.

Kertesz believes that one of the most

powerful ways to decrease waste generation and increase waste reduction is through education.

"In order to recycle and treat waste in the best way, school children, the public and politicians must be better informed about the effects of waste production and the different ways of taking care of waste. The lack of proper education on different levels in this field is a serious obstacle toward the development of even better solid waste management in Sweden."

Kertesz advocates a variety of waste reduction techniques and says that "there must not be any contradiction between the different methods; instead, they should be regarded as complementing each other."

To accomplish this, Kertesz suggests a management strategy that would incorporate:

- improved collection and transportation of waste,
- incineration,
- landfilling,
- centralized mechanical separation and composting,
- large-scale bio-gas production,
- cogeneration, and
- improved collection and treatment of hazardous waste.

In 1990, the Swedish parliament further expanded solid waste guidelines requiring every municipality in Sweden to draw up a "solid waste plan" for handling of all wastes. The law also called for separation of wastes before delivery for final treatment, cessation of the incineration and landfilling of unseparated waste by the end of 1993, and recovery of methane gas from landfills for energy use or flaring the gas away.

Sweden's waste disposal program reflects the attitude that "solid waste is everybody's problem." The costs of handling domestic waste, for example, are borne by households and homeowners. The law says that the fee can be as high as needed to cover the actual costs of solid waste management and costs cannot be offset by ordinary taxes.

"In the field of waste management, we need to create a long-term demand for recovered raw materials," says Kertesz. "International collaboration in the field of environmental protection also needs to be intensified." 14

Energy Alternatives

ENR promotes a variety of energy sources

The goal of promoting energy production in an environmentally positive way continues to move forward in Illinois.

While the energy bill before Congress has been watered down and stripped of key elements, ENR is advancing a number of projects designed to demonstrate the viability of alternative energy and renewable resources. As the following update illustrates, the projects take advantage of a variety of energy sources. In addition to perfecting technologies and techniques, these efforts are addressing economic issues, as well as the need to inform the general public about the availability and advantages of using these alternatives.

Photovoltaic fact sheets

The ENR alternative energy section is developing fact sheets describing four utility interconnected photovoltaic projects that it has sponsored. The fact sheets will provide information on the 2-kilowatt Amtrak train station in Bloomington-Normal, the 4-kilowatt PV system at the Regional Agricultural Research Center in Effingham, the 2-kilowatt PV system on the Tri-County Energy Home in Nashville, and the 6-kilowatt PV system at Blackberry Farm in Aurora. When completed at the end of May, these four fact sheets will complement six previous photovoltaic fact sheets describing stand-alone applications in Illinois.

Small power producers

The Center for Neighborhood Technology has completed a preliminary report titled "Status of Small Power Producers in Illinois and Review of Interconnect Practices." This study identified approximately 120 small power producers interconnected to utilities in Illinois, including 5 hydroelectric facilities, 11 wind installations and 5 photovoltaic systems. A survey of these 120 small power producers was conducted to identify the barriers and obstacles to interconnection. Among the factors cited by producers were costs, time delays, buy-back rates, and regulations. Copies of this report will be available this spring. An upcoming report will develop recommendations addressing the identified

barriers.

Vienna ethanol project videotape

Vienna Ethanol Project, a 20-minute videotape, has been completed by the alternative energy section. It will be presented at the next project manager's meeting in Vienna and will then be available to the public.

Update on alternative energy research

The alternative energy section is conducting a survey of all identified researchers in the state who are involved in alternative energy research. This effort will provide a valuable status report on such research activity. It will also give researchers and sponsoring organizations throughout the nation information regarding Illinois' commitment to ethanol, solar, wind, biomass, hydroelectric and other alternative energy technologies. This document is expected to be available by June 30.

Solar 90 program

The alternative energy section has initiated the Solar 90 program for vocational schools in the state that have an ongoing construction trades program. The purpose of the program is to incorporate passive solar and energy-efficient design concepts into the home building projects of the construction trades program. The Solar 90 program is modeled after the Solar 80 program, which provided information to students on energy-efficient construction and design. More than 40 schools in the Solar 80 program built passive solar homes. A workshop on passive solar design is being developed for the teachers who are interested in participating in the program. This will be presented in April or early May.

Through these and other projects, ENR is increasing the public's awareness that alternatives to traditional energy sources exist and are beneficial to the environment. Demonstrating the operational and economic feasibility of these projects will encourage policy makers to give greater consideration to alternative energy sources as part of a national energy strategy. ■

Energy in Rural America: Profits and Opportunities in Agriculture, Fuels and Utility Issues June 1-2, 1992



This conference offers invaluable information for those involved in agricultural research, renewable energy or renewable fuels production, the farming/livestock industry, or small local utilities.

Attendees will learn how rural America can increase economic stability through energy efficiency, demand-side management, renewable energy production and more.

The conference will be held at the Embassy Suites Hotel in Des Moines, Iowa. The \$85 registration fee includes two breakfasts, two lunches and one dinner. Call (515) 224-1700 for room reservations; a block of rooms will be held until May 11.

For more information, contact the Iowa Department of Natural Resources, (515) 281-8666; Dave Loos at ENR, (217) 785-2800; or conference coordinator Gail Ettinger, (708) 864-5651.

Geological Survey offers field trip to Galena *continued from page 5*

pant must sign an indemnity waiver to permit entrance to pits, quarries and mines.

Tours are held rain or shine. Comfortable clothing, walking shoes, a sack lunch and self-transportation are necessities. A hard hat and safety glasses are recommended precautionary equipment, if available.

Drivers should begin the tour with a full tank of fuel. To ensure safe travel on some roads and bridges, only mid-sized (12,000 pounds) or smaller school buses are permitted.

People of all ages are welcome, but each grade school student must be accompanied by a responsible adult, and high school classes should be supervised by at least one adult for every ten students. Teachers will find the trips especially helpful, providing information for earth science and other educational units.

The caravan will stop frequently for exploration, discussion, photo opportunities and collection of rocks and fossils. Each participant will receive a field trip guidebook that describes and explains the geology and topography along the route and at the stops. A list of previous field trip guidebooks is available for use in planning class tours or private outings.

The Illinois State Geological Survey,

located in Champaign-Urbana, conducts basic and applied geological research aimed at:

- locating mineral resources and providing information related to the evaluation, optimum development, and use of these resources, and
- providing basic geologic data to Illi-

nois residents and agencies charged with formulating sound policies for land use, waste disposal, pollution and construction.

The Survey also collects and stores large quantities of basic geologic information to maintain a database for current and future research.

For more information about the field trip to the Galena area or about services provided by the Survey, call (217) 333-7372 or (217) 244-2407. □



Participants in the May 16 geological field trip to Jo Daviess County will visit abandoned mines, such as this one near Galena. During the 1800s, the Galena area was the heart of the Upper Mississippi Valley lead mining district and the top producer of lead.

Photo by David L. Reinertsen, Illinois State Geological Survey

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Governor's pollution prevention award winners chosen

Governor Jim Edgar personally commended nine Illinois businesses and organizations for their efforts to reduce hazardous and solid waste in Illinois.

The award recipients were recognized at the fifth annual Governor's Pollution Prevention Awards ceremony for implementing techniques and management strategies to better manage the state's waste.

"The winners of these awards have exhibited a commitment to protect our environment," Edgar said. "They have made an investment in our future that will pay dividends in a variety of ways. I am pleased to recognize these representatives for their invaluable efforts."

Award recipients were judged in a statewide competition on their innovative efforts to reduce hazardous waste and how these efforts benefit the environment. Applications were reviewed by ENR and the Illinois Environmental Protection Agency (IEPA), with final approval given by the Governor's Office.

In addition to the nine award winners, 17 companies, organizations and educational institutions received certificates of recognition for their waste reduction and pollution prevention activities.

"It is increasingly clear that Illinois companies of all sizes are making pollution prevention a top priority, while keeping the costs to a minimum," ENR Director John S. Moore said.

The ENR Hazardous Waste Research and Information Center works closely with Illinois industries in helping them solve hazardous waste problems.

"Dealing after the fact with pollution and pollution-generated problems is a time-consuming and very costly process, which sometimes even generates new problems," IEPA Director Mary Gade said. "It is both more efficient and much more cost effective to deal with pollution where it starts by taking a long and careful look at the way we do things and finding better ways of doing them. We may not be able to prevent pollution completely, but we certainly

can—and must—minimize it."

For more information on reducing your company's hazardous waste, contact the Hazardous Waste Research and Information Center in Champaign, (217) 333-8940. □

ENR Director John S. Moore (right) looks on as Governor Jim Edgar (center) congratulates David Thomas, director of ENR's Hazardous Waste Research and Information Center, on the work of the award recipients.



Photo by Tom Hecht, ENR

Recipients of 1991 Governor's Pollution Prevention Awards and Certificates

Category: Small Business/Industry (100 employees or less)

Sun Chemical Corporation, Chicago, General Printing Inks Division, produces packaging ink for the printing industry. The products are manufactured with various solvents, such as toluene, ketones, acetates, alcohols, ether, resins and pigments. Sun achieved an overall 13 percent waste reduction in 1990 through reducing the volume of waste from 227,313 gallons to 198,215 gallons. At the same time, the pounds of ink produced increased from 36 million pounds to 41 million pounds. The corporation achieved the reduction by dedicating equipment to specific products, reusing water rinses, reusing and reclaiming cleaning solvents, recycling obsolete raw materials and slow-moving materials into products, conducting waste reduction training, and increasing quality control in production. Last year's 13 percent reduction is in addition to a 31 percent reduction achieved in 1989.

Sun Chemical Corporation, Kankakee facility, is the world's largest producer of gravure ink. Sun Chemical reduced the generation of two waste streams, one consisting of 95,000 pounds per year of organic solvents. The ink manufacturing process was modified to reintroduce the samples directly into the product line. This process modification has resulted in savings of \$75,000 for the corporation, including the cost of recovered raw materials and avoided waste disposal costs. Sun also reduced the amount of solid, flammable hazardous waste from 60,000 pounds to 54,000 pounds. A Sun Chemical team continuously assesses waste reduction opportunities and quality improvements at the facility.

Certificates

Twinplex Manufacturing Company, Wood Dale
Chicago Fire Brick Company, Chicago
First Brands Corporation, Alsip

continued on page 9

Diverse interests plague comprehensive energy policy

Developing a national energy strategy is an extremely complex process. A wide range of competing and often conflicting interests must be acknowledged and, if possible, accommodated. Whether this can be accomplished without favoring one side or another was the focus of the 19th Annual Illinois Energy Conference held November 14-15 in Chicago.

"The National Energy Strategy: A Balanced Program?" brought together representatives of the key groups involved in this process. Virtually all the major issues were touched upon, including energy production, use management, conservation, alternative energy, environmental concerns, economic impacts, current and future technology, foreign competition, demographic trends and political considerations. In fact, the comprehensive treatment of energy policy highlighted the difficulty of bridging the diversity of interests that have a stake in this process.

Traditional vs. alternative

One of the major points of conflict involved traditional approaches vs. alternative approaches. A good example of this divergence was the exchange between

Michael Canes of the American Petroleum Institute and Christopher Flavin of the World Watch Institute. Canes maintained that the petroleum industry position regarding a national energy strategy was "not all that different from the public perspective." He offered a strong defense for the continued use of oil. Among his arguments were the abundance and usefulness of oil, the price of oil ("in real terms oil costs less today than 50 years ago"), and the link between economic growth and energy use.

A challenge for oil

Canes viewed the issue at hand as a challenge to take advantage of oil's benefits "while keeping its disadvantages under control." To do that, the petroleum industry prefers "decentralized, market-based decisionmaking" in which government restrictions are removed or limited in terms of specificity, for example, government standards are acceptable, but specifying which fuels should be used is not. Canes also indicated that a high priority of the petroleum industry is a national strategy that enhances the nation's ability to respond to short-term energy disruptions.

Flavin was quite critical of the Bush administration's energy policy and the Johnston-Wallop bill considered by the U.S. Senate. He charged that these efforts focused too much on supply and protecting existing industries, and not enough on environmental concerns and renewable resources. For example, he stated that the carbon monoxide problem was not addressed in this legislation, and that technological advances in alternative energy sources were "underestimated."

Flavin used coal to illustrate his point that the Bush administration is attempting "to hold on to the horse and buggy era." He argued that "coal is running out of steam to meet environmental standards," and that "environmental constraints will make coal more expensive." In contrast, he maintained that renewable resources are ready to go commercial, are "far less expensive than coal and nuclear power plants," and are cleaner and more efficient.

A challenge to government

Flavin encouraged the federal government to adopt some of the innovative and progressive measures being applied at the

continued on page 10

Improving automobile fuel economy

One of the chief concerns voiced against higher fuel economy standards is that they will come at the cost of human safety. According to this argument, automobile manufacturers will have to produce a lot of little cars that will have no chance of avoiding major damage in crashes with larger cars.

Steven Plotkin of the Office of Technology Assessment seriously questioned this point of view at the 19th Annual Illinois Energy Conference. Plotkin maintained that "substantial gains can be achieved with little or no downsizing if sufficient lead time is available." However, he also acknowledged that the market is "going in the wrong direction" at the present time. Among the factors working against fuel economy are more light trucks and vans, more powerful engines, higher emission and safety standards, more traffic congestion in urban areas, and more options being selected, such as air conditioning and four-wheel drive.

Much of Plotkin's presentation focused on the complexity of improving fuel economy. Policymakers need to consider a number of variables before setting a specific

standard. The mix of large and small cars within a car company's fleet will affect that company's ability to meet certain standards. The time schedule and the lead time are critical factors, as are safety and emission regulations. Development of new technologies is a variable only partially under the control of car manufacturers, but one that can greatly affect success or failure. Among the key technologies Plotkin cited were weight and drag reduction, intake valve control, overhead cam and four-valve engines, advanced transmissions and engine friction reduction. Finally, corporate values and philosophy figure in the decisionmaking model, such as determining acceptable costs and safety risks.

Plotkin noted that some car companies—he named Toyota as an example—would have no problem meeting most fuel economy standards. He also commented that "by the year 2001, fleet values of about 35 miles per gallon are practical." However, he stressed that the specific figure must be arrived at within the context of the various factors he had cited. ■

Area gets new recycled plastic bottles

The Coca-Cola Company is now offering four of its products in 2-liter plastic soft drink bottles made partially from recycled plastic soft drink bottles.

Central Illinois residents can now buy regular and caffeine-free Coca-Cola classic and diet Coke in plastic bottles made with a blend of 25 percent recycled plastic resin and 75 percent "virgin" resin. The new bottles no longer require "base cups."

Polyethylene terephthalate (PET) plastic resin has been recycled into other products, but has never before been recycled from plastic soda bottles *back into* plastic soda bottles.

"It's obvious to me and it should be obvious to everyone that we have to end the throwaway society," Illinois Governor Jim Edgar said.

The Coca-Cola Company began its Illinois campaign in November through the Central States Coca-Cola Bottling Company, a division of Johnstons Coca-Cola Bottling Group of Minneapolis. Central States provides products to Springfield, Champaign-Urbana, Decatur, Peoria, Bloomington-Normal, Galesburg, Peru, Mattoon and nearby communities.

The company is hoping that consumers will get more involved with plastic recycling efforts now that there is a new end use for plastic recycling.

"This is an environmental turning point, a step in the right direction, for plastics recycling," said Hugh Pittenger, vice president and general manager for Central States.

"More than 210 million pounds of plastic soft drink bottles are recycled annually through more than 3,500 curbside, buy-back and drop-off collection programs around the country, including programs in our region," Pittenger added. "The recycled plastic bottle is being introduced to ensure long-term markets for plastic soft drink bottles to accompany the expansion of collection programs that include plastic."

The plastic 2-liter soft drink bottle was first introduced in 1978, containing 91 grams of plastic in the base cups. Recycled plastic was first used in the manufacture of the high density polyethylene cups in the early 1980s.

Through improved manufacturing processes, the Coca-Cola Company has

eliminated base cups on nearly 60 percent of its 2-liter soft drink bottles. This development reduced the bottle weight to 54 grams and also made the bottle more easily recyclable.

The remaining 40 percent with base cups now require only 68 grams of plastic, with the bottle weighing 48 grams and the base cup 20 grams.

The Coca-Cola Company and Hoechst Celanese Fibers and Film Group of Charlotte, North Carolina, developed the recycling process, which regenerates resin by breaking down plastic soft drink bottle polymer into its original components—purifying and blending the recycled resin



Coca-Cola Company photo

Central States Coca-Cola Bottling Company has introduced recycled plastic soft drink bottles into central Illinois. The 2-liter bottles of regular and caffeine-free Coca-Cola classic and diet Coke are made with a blend of 25 percent plastic resin and 75 percent "virgin" resin.

with "virgin" resin to make new bottles.

The U.S. Food and Drug Administration gave a favorable decision on the process in January 1991. In March, the Coca-Cola Company introduced the first plastic bottles made from recycled plastic bottles in a five-month market test in North Carolina.

Through the recent expansion of the availability of bottles made with recycled plastic into additional markets, the Coca-Cola system is further demonstrating "closed-loop" recycling, while encouraging greater recycling of plastic soft drink packaging by consumers. □

Conference to focus on "buying back the future"

ENR and the U.S. Environmental Protection Agency, Region 5, are cosponsoring the "Midwest Recycled Products Procurement Conference and Exposition" on April 30 and May 1, 1992, at the University of Illinois Assembly Hall and the Chancellor Hotel in Champaign.

Academic, public and private sector purchasing officials and recycling coordinators interested in exploring the design of progressive procurement policies and in viewing a wide variety of products made from recycled materials should attend. Commercial businesses will also find the event useful for keeping current with the rapidly changing markets for recycled products.

Recycling programs have made significant strides in confronting our nation's increasing solid waste problem. However, a recycling collection program is only the first step in the efforts to reduce the waste stream. The next step is to purchase goods made from recycled materials.

Procurement policies that support markets for recycled products can ensure the continued success of recycling. Effective purchasing strategies will close the recycling loop and improve market stability by increasing demand and reducing price fluctuations for these products.

The conference will include seminars led by officials who have taken the lead in design of innovative procurement policies and will provide an open forum for administrators to exchange ideas about proactive procurement strategies. Seminars by industry leaders will provide officials with information about the many products available in the marketplace that are made from recycled materials.

The exposition will provide direct contact with the firms that provide products to meet specific procurement needs, and will include a poster session for organizations to highlight individual procurement success stories.

For more information or to request a conference brochure, call the ENR information clearinghouse, 1-800-252-8955 (in Illinois) or (217) 785-0310. □

Institutions tackle the issue of hospital waste disposal

Waste disposal has become a major issue for hospitals, from both financial and public relations standpoints. Although infectious waste gets most of the press, 90 percent to 95 percent of the waste generated by hospitals is of the noninfectious type.

Hospital recycling is already being mandated in many parts of the country by city, county and state government. As with any new program, especially one that will involve every employee and usually an initial outlay of funds, the first step is to "secure the commitment of top management." The second step is to create a recycling task force with representatives from every employee level.

Hospital recycling was one of many workshops offered at the Midwest Recycling Conference held in Chicago last fall.

Chicago

Thorek Hospital and Medical Center in Chicago, a 218-bed acute care facility, began its recycling program a year ago. Hospital staff got a commitment from the front office, conducted a waste-stream analysis, and formed a recycling committee with members from each employee group.

"We had four goals," says Vice President Harry Monk. "First, to reduce our

regular waste by 30 percent; second, to reduce infectious waste by 30 percent; third, to use current staff to implement the program; and fourth, to break even at the end of the year."

Starting with an outlay of \$7,500 for a baler and \$2,000 for recycling containers, Thorek reduced its noninfectious trash by 50 percent and its infectious waste by the hoped-for 30 percent. No new employees were added to get the program off the ground and return on the initial investment was more than quadruple, netting a savings of \$45,000 the first year.

Thorek currently recycles cardboard—which is baled in the hospital garage and then stored in a warehouse for shipment, white paper, aluminum and newspaper. Cardboard, or "corrugated," as it's commonly called, and white paper account for 52 percent of the waste generated at Thorek.

Monk attributes much of the success of Thorek's recycling program to the enthusiasm of employees—from doctors and nurses to housekeeping, food services, and custodial staff. An in-service program was also developed to familiarize employees with the how's and why's of the program.

"Recycling containers are available on every floor of the hospital," says Monk. "Each is clearly marked with the recycling logo and labeled for a specific waste item. The recycling containers are a different color from other waste receptacles and meet national life safety codes."

In addition, to reduce the risk of intermingling infectious waste with noninfectious waste, recycling containers are not allowed in patient rooms and patient treatment areas, or in corridors or spaces that open onto corridors.

"Everything we can recycle is recycled," says Monk. "We've cut use of styrofoam by 58 percent by switching from disposable dishes to reusable plates and cups for patients and staff. We've also designed a refillable plastic mug (with our logo) and offered a discount to employees who use it instead of throwaway cups."

Thorek is also tackling the difficult problem of infectious waste. "This is the issue that scares the public the most," says Monk, "but there are items now being tossed into the infectious waste bin that can be recycled, for example, plastic intrave-

nous bags. As long as blood has not infiltrated the tubing, there is no reason why the plastic cannot be recycled. Of course, individuals cannot arbitrarily decide this issue on their own, but guidelines can be established and infectious wastes can be reduced."

Even though its program is a success, Thorek continues to hold regular staff meetings to ensure that the momentum continues.

Sioux City

Phyllis Packard is the solid waste coordinator for a four-county region in Sioux City, Iowa. One of Packard's clients is the Marian Health Center, a 465-bed regional health facility.

"The idea for recycling came from the Marian custodial staff," says Packard. "The senior vice president and the board of directors then formed a committee, because every pilot project is tested out on the CEO."

Marian's recycling program began in 1989. Called "Our Home, Earth Program," Marian recently received a \$75,000 grant from the Iowa Department of Natural Resources to develop a comprehensive recycling program that involves education, separation, collection, processing, marketing, and environmentally sound purchasing practices.

"Iowa has a bottle bill," says Packard, "so glass recycling was already in place. Unfortunately, other recycling markets cannot always be counted on. Paper and corrugated, especially, are hard to dispose of, so the emphasis is on waste reduction."

Meanwhile, recyclable materials are stored in a semitrailer truck parked near Marian's loading dock. Packard is also working with suppliers to find ways to develop markets for recycled goods. Packard says they even recycle the geraniums that decorate hospital grounds during spring and summer.

"We take the seeds in during the winter and start them indoors; the whole staff gets involved. When spring comes, we replant them outdoors. It's become quite a ritual!"

Sometimes you have to be extremely creative to achieve your goals, says



Thorek Hospital and Medical Center in Chicago designed a refillable plastic mug decorated with the hospital logo and offered a discount to employees to encourage use of the mugs instead of throwaway cups.



Many medical institutions' recycling programs involve "recycling everything that can be recycled," including switching from disposable dishes to reusable plates and cups for food service.

Packard, but "recycling is a high priority at Marian!"

Southern Illinois

Louise Couch is a first-line supervisor at the 99-bed Marion Memorial Hospital in southern Illinois. The hospital's recycling efforts have become a community affair.

"We pretty much started on our own," says Couch, "and without support from top management. We had a zero-dollar budget, so we relied on individual ingenuity

and lots of volunteers. Eventually every department of the hospital got involved and members of the community also began contributing to the operation.

"In the beginning we made our own recycling boxes, and volunteers from the hospital and the community sorted and prepared items for transport. On Earth Day 1991 we held in-service training for service groups and community organizations."

As with the health center in Iowa, the southern Illinois hospital has had trouble finding a hauler and a market for its waste. In the beginning Marion recycled corru-

gated, aluminum, newspaper and computer paper, steel and aluminum foil.

"A lot of our shredded paper is given to employees to use as animal bedding. We've also done away with disposable dishes, which has saved us \$1,500 since 1989. We used the money to buy picnic tables made out of recycled plastics."

In March 1991 Marion's main hauler was sold and the program floundered for a while, but the volunteer network reorganized and got the system back on track. Marion still doesn't have a hauler, so the hospital hauls its own recycled materials. The hospital also reprioritized the list of recyclables, now collecting aluminum foil, cans and computer paper.

No matter the program, the institution, or the obstacles encountered, all agree that waste reduction saves natural resources, improves public image, saves and often makes money, and, as in the case of Marion Memorial Hospital in southern Illinois, brings the community together to work toward a common goal.

Currently, most hospital waste is landfilled (75 percent) or incinerated (20 percent). Only 5 percent is being recycled. As landfill space continues to dwindle, however, more hospitals will be looking toward a waste reduction plan, and to meet the diversity of needs in a still-fledgling solid waste market, one that incorporates the "three Rs"—Reduce, Reuse, Recycle. 1a

Paper features multifamily rehab program

Maureen Davlin of the ENR consumer assistance section has been selected to present a paper at two prestigious conferences to be held in March.

Davlin, along with Paul Knight of the Energy Resource Center at the University of Illinois-Chicago, will present a paper titled "Super Insulation Rehabilitation of Multifamily Buildings" at the Southwestern Pennsylvania Energy Center's annual "Affordable Comfort Conference" in Pittsburgh, Pennsylvania. The conference is recognized nationwide as one of the most comprehensive energy conservation housing conferences in the United States.

Davlin and Knight were also selected to present the paper at the Energy-Efficient Building Association's 10th annual "International Energy-Efficient Building Conference and Exposition," scheduled for

March 4-7 in Triangle Park, North Carolina. The exposition features work of some of the nation's most renowned builders and attracts one of the largest groups of homebuilders of any such conference. The paper will also be published in the official proceedings of the conference, which is distributed worldwide.

The paper reports the results of the ongoing multifamily energy-efficient rehabilitation program conducted by the consumer assistance section. Davlin reports that energy-efficiency improvements of up to 75 percent have been achieved by incorporating cost-effective energy improvements in multifamily rehabs. The program provides funding and technical assistance to not-for-profit building owners renovating buildings for low- and moderate-income tenants. □

Global warming conference issues call for papers

The third annual International Conference on the Scientific and Policy Issues Facing All Governments will be held April 6-9, 1992, at the Westin Hotel O'Hare in Chicago.

The objective of "Global Warming—A Call for International Coordination" is to provide an international forum on scientific and policy issues facing governments with regard to the greenhouse effect and similar transnational environmental problems, including regional extreme climatic swing, water shortage, floods and acid rain.

For more information, contact Dr. Sinyan Shen, Natural Resource Management Division, SUPCON International, One Heritage Plaza, Woodridge, IL 60517-0275, (708) 910-1551 or (419) 372-8207. □

Remaking history at Dickson Mounds Museum

In 1927, Dr. Don F. Dickson, a Fulton County chiropractor and amateur archaeologist, began excavating what turned out to be a 900-year-old prehistoric American Indian cemetery. Dickson's excavation of the mound uncovered 237 skeletons of Indians of the Mississippian culture who had lived in the area near what is now Lewistown, Illinois. He opened the site as a private museum, which became known locally as Dickson Mounds, and for the next 18 years members of the Dickson family conducted public tours.

The site was sold to the state of Illinois in 1945 and operated by the Department of Conservation until 1965, when it was transferred to the Illinois State Museum, a division of the Department of Energy and Natural Resources. A new museum building, constructed to house the cemetery and other exhibits, opened in 1972, preserving the original Dickson burial excavation in one wing.

Possibly the first place in North America where an extensive prehistoric cemetery was made available for public view, Dickson Mounds has attracted visitors from throughout the country since it

opened, becoming a state museum of national stature and serving as a cultural landmark in the area.

The excavation has drawn visitors not only from the general populace, but also professional archaeologists, which resulted in further archaeological investigation in the area. The University of Chicago initiated a systematic survey of the prehistoric sites in Fulton County in 1930. More than 3,000 archaeological sites have been recorded since then, and the region continues to be a focal point for archaeological research.

The human skeletons and associated artifacts found in the excavated mound have been studied and reported on extensively by archaeologists and physical anthropologists. The numerous analyses have provided significant contributions toward understanding the health, characteristics of population, and social organization of the Mississippian Indians.

On January 3, 1990, the museum announced its intention to close the burial exhibit at Dickson Mounds Museum and dedicate the burial chamber wing to the memory of the Indians who once lived in the region.

Several pieces of federal legislation had been proposed in 1989 that addressed disposition and treatment of human skeletal remains. Major museums, including the Smithsonian Institution in Washington, D.C., and the Field Museum of Natural History in Chicago, agreed to remove the skeletal remains of American Indians from public display and announced policies for the return of human skeletal remains to tribes of origin. Professional archaeological, anthropological, and museum organizations appointed special task forces to seek compromises with American Indian representatives on the treatment and disposition of human remains.

It became apparent that continued display of American Indian remains at Dickson Mounds Museum would go against legislation, professional museum standards, and concerns of American Indians. Disposition of human remains unearthed from archaeological sites had become a serious and immediate issue in Illinois.

Museum staff had monitored the grow-

ing controversy over exhibition of American Indian remains for more than a decade. The initial recommendation to close the burial exhibit resulted from the museum's heightened sensitivity and was endorsed by the museum board and then-Governor James R. Thompson.

The proposed closing dismayed many central Illinois residents who viewed the exhibit as a respectful exhibition of local cultural heritage and a valuable resource for educational purposes. Local legislators responded with a resolution urging the museum to reverse its decision.

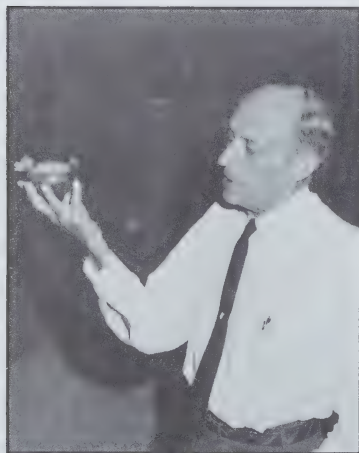
The resolution also called for a public hearing, which was conducted by ENR in February 1990. The 500 people who came to Peoria's Bradley University to speak out at the forum presented views that were equally divided between support for closing the exhibit and pleas to keep the exhibit as a public resource.

Thompson subsequently announced that a final decision on closure would be postponed until he could schedule a personal visit to view the site and further evaluate the issue, while ENR legal and museum staff reviewed the volume of oral and written testimony.

Saying that "there has been a great deal of thoughtful discussion and emotional debate about the propriety of this exhibit," Thompson announced his decision to keep the Dickson Mounds burial site open in August 1990.

"I have listened carefully to all sides. I've heard from museum professionals, tourists, local residents, Native Americans, and researchers. I have visited the museum three

The Dickson Mounds Museum Lifeways and Society exhibits portray information to foster an understanding and appreciation of American Indian culture. The museum's education programs enthrall thousands of schoolchildren every year.



Illinois State Museum photo

Dr Don F. Dickson displays an artifact found in the 900-year-old burial mound he excavated in 1927. His family conducted public tours for 18 years at what became known as Dickson Mounds.





times recently. I have weighed all of the arguments about whether this burial site should remain open or be closed to the public.

"My decision is that it should remain open to enhance the educational program offered by Dickson Mounds Museum and to help all of us learn more about life in Illinois many centuries ago."

Dismayed by this decision, various Indian groups from throughout the country increased their opposition to the display of the ancient remains, stating that it demonstrates disrespect for their culture and offends their religious beliefs, and demanded that the bones be reburied. Demonstrations calling for closure of the exhibit were mounted, several taking place in the burial chamber itself.

The Edgar administration reopened discussion on the issue, meeting with representatives of Indian rights groups in efforts to strike a compromise. After several months of negotiations, Governor Jim Edgar announced in November 1991 that the burial exhibit will close on April 3, 1992, and the remains will be entombed.

Museum staff will first catalog the



burial site to gather historical and scientific information. The remains will then be reinterred, and the burial site will be returned to its historical design as much as possible.

Closure of the burial room is part of a \$4 million revamping of Dickson Mounds Museum announced by Edgar. The planned renovation is intended to highlight the rich archaeological heritage of the Spoon River valley area southwest of Peoria.

Improvements planned for the museum include:

- renovation and expansion of the building;
- construction of dioramas that will feature life-size figures depicting the culture of the Mississippian Indians who inhabited the Midwest and South about 1,000 years ago, with special emphasis on portraying the burial ceremonies and processes;
- remodeling of the burial chamber to accommodate a sophisticated sound-and-light show and to depict what a burial mound looked like; and
- renovation of the museum's auditorium.

"We are going to greatly enhance Dickson Mounds Museum as both an educational tool and an economic opportunity for western Illinois, while addressing the

concerns of Native Americans at the same time," Edgar said.

"I am immediately releasing \$275,000 in already-appropriated funds to plan for the construction and improvement at Dickson Mounds, which I believe will provide for one of the best historical sites in the nation that will show the important role that Native Americans played in the history of this state and this nation.

"I will ask the General Assembly in my capital budget to appropriate approximately \$4 million for the construction and remodeling of Dickson Mounds Museum," Edgar said. The money would come from capital building funds and not the general revenue fund used to pay the state's bills.

"I see this as a very bright beginning for Dickson Mounds Museum, not the end," Edgar noted. "I am convinced that, once this project is completed, it will give Illinois another very significant site for both our young people and other people to learn, and also will attract tourists and economic development to this important part of Illinois." 85



A bust of a spear thrower from the Archaic Period, 8000 B.C., greets the throngs of visitors that will continue to visit Dickson Mounds Museum to learn about the heritage of the early American Indians that inhabited Illinois.



Photos on this page by Marlin Ross, Illinois State Museum

New species of zebra mussel invades Great Lakes

A second species of zebra mussel has been found in the Great Lakes, according to a recent report by Dr. Ellen Marsden of the Illinois Natural History Survey.

This new species could potentially tolerate a different range of environmental conditions than the zebra mussel that invaded North America several years ago. Worse still, the second species could respond differently to methods currently used to control the original zebra mussel invader.

Zebra mussels, inadvertently carried into the Great Lakes in the ballast water of cargo ships from Europe, cause serious problems in lakes and rivers. By filtering large amounts of water for plankton, these small, rapidly multiplying mollusks could potentially devastate the food supply of fish and other aquatic organisms. By attaching in large, dense colonies to underwater objects, such as boat hulls and water intake pipes, the mussels have already caused great economic losses. Some experts project that the invasion of zebra mussels will ultimately cost billions of dollars.

Originally introduced into Lake St. Clair, the first zebra mussel species is now found in all of the Great Lakes. In southern Lake Michigan, utilities and steel plants have increased their biofouling control treatments to prevent infestations of water intake pipes. Natural History Survey re-



Illinois Natural History Survey photo

Zebra mussels form dense colonies on underwater objects. Juvenile zebra mussels of the first species discovered in the Great Lakes cluster like grains of sand on adult mussels (pictured slightly larger than life-size).

searchers recently discovered that zebra mussels have now spread throughout the Illinois River and into the Mississippi River.

To date, the new mussel species has been found only in Lake Ontario and the Erie Canal, says Marsden, who presented the research findings in Rochester, New York, at the Second International Zebra Mussel Research Conference. Sampling in Lake Michigan has not yet detected the new species, which is distinguished by shell shape and genetic composition.

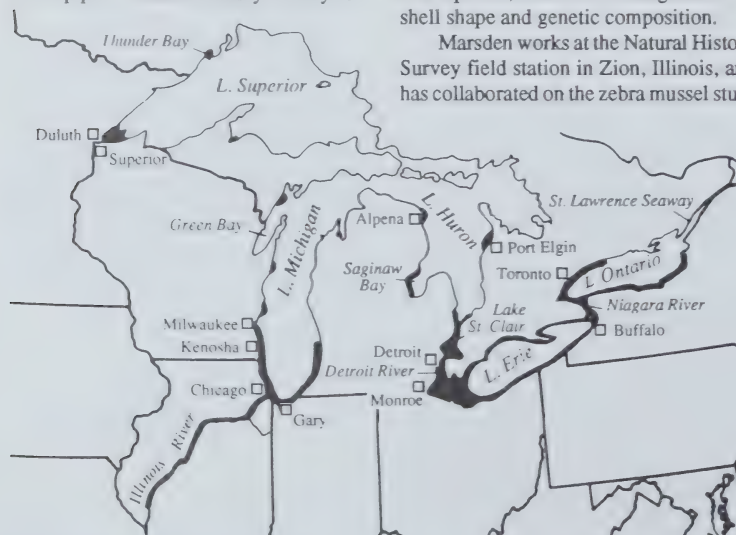
Marsden works at the Natural History Survey field station in Zion, Illinois, and has collaborated on the zebra mussel stud-

ies with Dr. Bernie May of Cornell University in Ithaca, New York.

The most common method for removing zebra mussels is to treat encrusted pipes with chlorinated water. However, use of chlorine poses potential environmental hazards for freshwater organisms. Marsden says efforts to control zebra mussels have been hampered by insufficient knowledge of its basic biology. Even less is known about the new species, including its identity—it may be one of more than six species of zebra mussel found in Europe.

Increasing our knowledge of these mussels should lead to better and safer control methods, Marsden says. She also notes that control strategies developed for the first species may not be as effective against the new species, just as an inoculation for Asian flu will not work if this year's strain happens to be the German flu.

Marsden and May are planning to study the biology of both species as they monitor the spread of these pests. They will also compare the genetic profile of the new species with those of zebra mussel species from various parts of Europe to determine the identity of the new species and from where the invaders originated. The work of Marsden and May is being funded by the U.S. Environmental Protection Agency through the Illinois-Indiana Sea Grant Program. □



The approximate distribution of the zebra mussel in the Great Lakes and the Illinois River.

Governor's Pollution Prevention Awards continued from page 1

Category: Medium Business/Industry (101 to 499 employees)

Advanced Filtration Systems, Inc., Champaign, manufactures liquid filtration products using fully automated, computer-integrated manufacturing techniques. An important feature of manufacturing liquid filtration products involves a urethane process that, in the past, generated a large volume of waste. AFSI has redesigned its process for dispensing polyurethane and the process for handling bulk constituent chemicals and ultraviolet resin. Consequently, AFSI has eliminated 100 percent of the 144,000 gallons per year of polyurethane/solvent flush waste, 100 percent of the 54 tons per year of methylene chloride emissions, 14,070 gallons of isocyanate, and 11,450 gallons of ultraviolet resin.

AFSI has also established a recycling committee to identify markets for scrap materials, to control incoming purchases to avoid loss or waste, and to identify alternative means of packaging that are more environmentally desirable.

AGI Incorporated, Melrose Park, manufactures and prints disc packages, cosmetic folding cartons, etc. AGI uses sheetfed and web offset printing presses, each of which generates a waste fountain solution. AGI is successfully distilling the fountain solution to recover the isopropyl alcohol for reuse. Through distillation, AGI will reduce the amount of waste generated by 90 percent, or 10,400 gallons of waste annually. With the initial outlay for equipment and testing, AGI's payback period is 12 months. The cost savings realized by AGI is at least \$30,000 per year. Although distillation technology is not new, AGI's particular application is considered new to the printing industry. AGI has dedicated a large capital investment in switching to ultraviolet and electronic beam inks to reduce the use of solvents and emissions of volatile organic compounds. AGI is also aggressively recycling paperboard waste and marketing "recycled" paperboard products to its customers.

Certificates

Imperial Eastman, Niles
Apollo Colors, Inc., Rockdale
Mobil Chemical Company, Joliet
Kraft Food Ingredients, Champaign

Category: Large Business/Industry (500 or more employees)

Caterpillar, Inc., East Peoria, has established a plantwide Environmental and Pollution Prevention Team that reports on a monthly basis on ways to make pollution prevention an annual plant objective. The team has been successful in systematically reducing these wastes: ammonia, aluminum oxide, chlorinated/fluorinated solvents, waste oil and dunnage. The flow rate of ammonia emissions from heat treat nitriding operations was reduced by 19 percent for a cost savings of \$3,750. Aluminum oxide waste was reduced to half the amount previously generated, with an annual cost savings of more than \$530,000. Waste oil has been recycled and reused at the rate of 52,000 gallons in a six-month period, with a cost savings of \$118,000, and a recycling program has been established to recycle weld wire spools, cardboard, wooden pallets, and office paper.

Illinois Power Company, Decatur, has established a pollution prevention program for the purpose of "making reduction, reuse and recycling a way of life" among its employees. Thirty-six facility waste minimization coordinators have been assigned the goals of reusing utility poles and tree limbs and ethylene glycol; recycling scrap metal, paper, concrete, asphalt, and plastic gas pipe; eliminating CFC-based styrofoam; requiring suppliers to use returnable containers; and burning waste oil for energy recovery. Illinois Power also produces a newsletter that provides for exchange of materials between facilities.

Certificates

Honeywell Inc., Chicago
Abbott Laboratories, Abbott Park
Caterpillar, Inc., Pontiac

Category: Trade Associations

Chemical Industry Council of Illinois, Rosemont, with 111 members, established the Responsible CARE Program for Chemical Manufacturers Association members.

Certificate

American Electroplaters Society, Chicago Branch

Category: Vendors

Nalco Chemical Company, Naperville, developed the returnable, stainless steel PORTA-FEED container, eliminating the need for disposable chemical drums and the chemical residue that accompanies drums. Since 1984, more than 900,000 drums and 900,000 gallons of residual chemicals have been eliminated. Nalco has invested more than \$76 million toward this effort, and will continue to invest heavily to eliminate disposable drums by the end of 1993.

Certificates

Ozoteq Inc., Northwestern University, Evanston
Thermal Fluid Start, Inc., Plainfield
Stericycle, Inc., Rolling Meadows

Category: Educational Institutions

Northwestern University, Evanston, with a student and faculty population of 143,000, established a comprehensive recycling program and initiated an aggressive procurement program. The amount of materials recycled is equal to 685 tons per year. The procurement program emphasizes recycling: 44 percent of all copy paper purchased for the university is recycled paper.

Certificate

Streator Township High School, Streator

Category: Community Groups

Certificates

Chicagoland Bicycle Federation, Chicago
Aurora Sanitary District, Aurora

Comprehensive energy policy *continued from page 2*

state levels, such as stricter emission standards and support for alternative fuels. He offered the belief that the marketplace will eventually give us a different set of options from the ones being identified and used by the U.S. Department of Energy (U.S. DOE). In particular, he foresees a reduction in our use of oil, and noted that the United States could eliminate all imported oil within 15 years by switching to natural gas.

Varied viewpoints

The difficulty in achieving consensus was addressed from other perspectives. Albert Chesnes from the U.S. DOE pointed out the magnitude of our nation's dependence on transportation. He noted that while transportation, the largest sector user of petroleum, is a prime contributor to air pollution, it also accounts for 15 percent of our gross national product. Chesnes said a national energy strategy should combine the goals of energy and economic efficiency, secure future energy supplies and enhance environmental quality, but acknowledged the constraints working against these factors.

Stringent standards

Thomas Hanna presented the transportation industry view of more stringent fuel economy standards. He argued that higher corporate average fuel economy (CAFE) standards would produce a number of negative effects, including further downsizing and greater safety risks to motorists. He said this approach is an "inefficient method of reducing fuel consumption" and would neither reduce our dependence on imported oil nor make a significant impact in reducing greenhouse gases. Hanna told the audience that automobile manufacturers have been working to improve fuel efficiency, such as using new materials that have reduced the average car weight by 1,100 pounds. He also described some of the practical difficulties of dealing with CAFE standards, including the use of car fleets as a measuring unit.

Mitch Beaver of ENR offered a more optimistic outlook that progress can be made in this area. He cited the efforts under way in Illinois to make ethanol a viable fuel source. Illinois' support of

ethanol projects is guided by a set of policy principles. These include the beliefs that original manufacturers shall produce engines that can use ethanol and allow the use of flexible fuels; ethanol cars must operate just like ordinary cars; data collection should be consistent with the standards used by the U.S. Environmental Protection Agency, the U.S. DOE and other states; and joint ventures should be encouraged so that no one unit bears all the costs.

Illinois' ethanol projects

Beaver also described some of the ethanol projects ENR currently supports. These include the ethanol bus project in Peoria, in which 14 buses will be using dedicated ethanol-powered engines. An ethanol fuel cell/battery project operated by PACE in the Chicago area will, according to Beaver, "substantially reduce emissions" from the bus using this system. Heavy-duty, over-the-road trucks using ethanol-powered engines will be tested over a three-year period. Illinois, Nebraska, Missouri, Iowa and Indiana are cooperating in the effort to ensure fuel availability for these trucks. The state of Illinois is adding 12 Chevrolet Lumina's to its fleet in 1992. These cars are designed to run on 85 percent ethanol fuel.

For ethanol to gain greater acceptance, Beaver emphasized that greater efficiency is needed in the ethanol production process to lower costs. He added that a project involving ENR, Pekin Energy Company and the University of Illinois will aid in this effort. The goal of the project is to develop a new membrane technology that will selectively separate desired products out of the production system more efficiently.

Utilities' role

Another aspect of a national energy strategy addressed in detail involved electric utilities. Charles Stalon of Michigan State University observed that two major challenges confronting decisionmakers is determining the optimal mix of large and small power plants, and deciding when competition is or is not better than monopoly. He criticized regulatory agencies for employing what he called "perverse"

pricing policies in the early 1980s. Stalon predicted that the current structure of the electric utility industry will not survive and will have to reform.

Rate structure changes

Howard Learner of Business and Professional People in the Public Interest charged that "utilities have not pursued energy efficiency" and that public utility commissions "have not forced them to do so." To promote greater energy efficiency, Learner argued, utilities must change their rate structures from a high initial block and a low tail block to just the opposite. Utilities should be forced to engage in least-cost energy planning and participate in the dissemination of energy-efficiency information to consumers. Learner also suggested that financial institutions get involved in financing energy efficiency technique adoption by consumers.

Clark Gellings from the Electric Power Research Institute presented an overview on the status of demand-side management and the outlook for electricity use. He emphasized that efficiency has been improved significantly, and will continue to improve, in areas such as motor drives, lighting, heating and cooling, and refrigeration. Gellings also noted that, due to a lack of information and a lack of consumer interest, there isn't much "market push" to implement energy-efficiency techniques.

Impressions

The observer attending this conference was left with several impressions. The various parties affected by a national energy strategy are well organized and able to articulate their particular points of view. It is quite apparent that the issues under debate involve billions of dollars and that the losing side will expect some type of financial compensation or consideration. There is also a sense that the parties are firm, if not entrenched, in their positions, thus limiting their willingness to compromise. Finally, there is the high probability that political factors will ultimately play a prominent role in the resolution of these conflicts or the failure to achieve a new national energy strategy. ■

Energy Alternatives

ENR earns distinguished service award from corn growers

The Illinois Corn Growers Association (ICGA) presented ENR Director John S. Moore with an award for "distinguished service to agriculture" at the association's annual awards banquet in December.

ICGA President Leland Behnken cited the dedication of the department and Moore's personal commitment to ethanol fuel development for earning ENR its second ICGA award in two years. ENR has been instrumental in research and development work that has positioned ethanol to play a key role in Illinois' energy future.

"In the past year, ENR has again had the opportunity to work closely with the Illinois Corn Growers on projects to promote and accelerate the development and growth of Illinois' renewable fuels industry," Moore said. "It has been a successful year for ENR, the Illinois Corn Growers,

the alcohol fuels industry, and Illinois."

The upcoming year shows promise of being just as successful. The ethanol buses for the Greater Peoria Mass Transit District should be arriving before July, the ethanol-powered GM Lumina will be in Illinois by June, and the four ethanol heavy-

duty trucks should arrive in March. Comprehensive emissions testing is expected to be under way next year at this time for these ethanol vehicles. ENR may also play a part in researching and developing additional technologies to reduce the costs of producing ethanol. □



Leland Behnken, president of the Illinois Corn Growers Association, presents the Distinguished Service to Agriculture award to Mitch Beaver, director of the ENR Division of Energy Conservation and Alternative Energy Development.

Photo provided by Illinois Corn Growers Association

Energy in Rural America: Profits and Opportunities in Agriculture, Fuels and Utility Issues June 1-2, 1992

Are you involved in the farming/livestock industry, renewable fuels production, agricultural research, renewable energy or small local utilities? If you are, this is a conference you will want to attend this year.

In three days, learn how rural America can increase economic stability through energy ef-

ficiency, demand-side management, renewable energy production and much more. Topics include:

- energy-saving agricultural technologies
- energy crop production and ethanol fuels
- energy cost savings from innovative utility programs

More than 70 speakers from the Midwest will present their research and their experience with keeping energy costs down and profits up, and with using less energy.

Where: The Embassy Suites Hotel, Des Moines, Iowa
When: June 1-3, 1992
Cost: \$85 per person, includes two breakfasts, two lunches, and one dinner

Hotel rates: Embassy Suites Hotel—100 single-occupancy suites available at \$59. Double suites are \$89. Call (515) 224-1700 for reservations; the room block will be held until May 11.

The first day is expected to feature several field trips. For more information, contact the Iowa Department of Natural Resources, (515) 281-8666; David Loos at ENR, (217) 785-2800; or conference coordinator Gail Ettinger, (708) 864-5651.



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 U.S. Department of Energy, Kansas City Support Office

Geological science field trip planned for Hardin County

Understanding the nature of Illinois' mineral resources and their natural surroundings will be the focal point of a geological field trip presented in April by the Illinois State Geological Survey.

Participants will tour the area around Cave in Rock and Rosiclare in Hardin County on April 25. The towns are located in southeastern Illinois along the Ohio River, the east border of the Shawnee Hills. The field trip area is about 35 miles south of the southernmost limit of continental glaciation in North America. Resistant bedrock of Pennsylvanian and Mississippian age underlies ridges that have a surface relief of about 450 feet. In some places, the rocks afford good fossil collecting.

The largest sinkhole in Illinois, called the "Big Sink," and the famous Cave in Rock cavern are among the many features common to this terrain that formed as groundwater dissolved part of the bedrock. Occasional igneous rock intrusions exposed by erosion in creek beds can be found along the route.

In the mid-1800s, the area north of Rosiclare was well known for its pig iron production, so the trip will include a visit to a restored iron furnace. This is also the fluorspar mining district of Illinois. The area is noted for lead and zinc produc-

tion—vital to its fluorspar mining industry.

The expedition is free and open to all ages. Each grade school student must be accompanied by a responsible adult, and high school science classes should be supervised by at least one adult for each 10 students. The trips are especially helpful to teachers planning earth and science units.

Each member of the group will receive a field trip guidebook of descriptions and explanations of the geology and topography to be viewed along the route and at

designated stops. Frequent stops will be allowed for exploration, discussion with the tour guides, and collection of rocks and fossils.

Participants will meet in the parking lot near the park entrance at the southeast edge of Cave in Rock, about one quarter mile east of State Route 1 near the ferry landing. The trip will begin at 8:15 a.m. and return at approximately 4 p.m. Caravans will depart immediately after registration, which includes signing an indemnity waiver to permit entry to pits, quarries, and mines. Participants should provide their own transportation, sack lunch, comfortable clothing and walking shoes. If available, bring a hard hat and safety glasses; they are occasionally needed. Drivers should begin the tour with a full tank of fuel. The excursion will be held regardless of weather conditions.

For more information about the field trip, contact the Illinois State Geological Survey, 615 East Peabody Drive, Champaign, IL 61820, (217) 333-7372 or (217) 244-2407. □



Photo by David L. Reinertsen
Illinois State Geological Survey

The large sinkhole north of Cave in Rock along the Ohio River in southeastern Illinois is one of the many geological features to be explored on the Geological Survey's April 25th field trip.

Illinois Resources

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